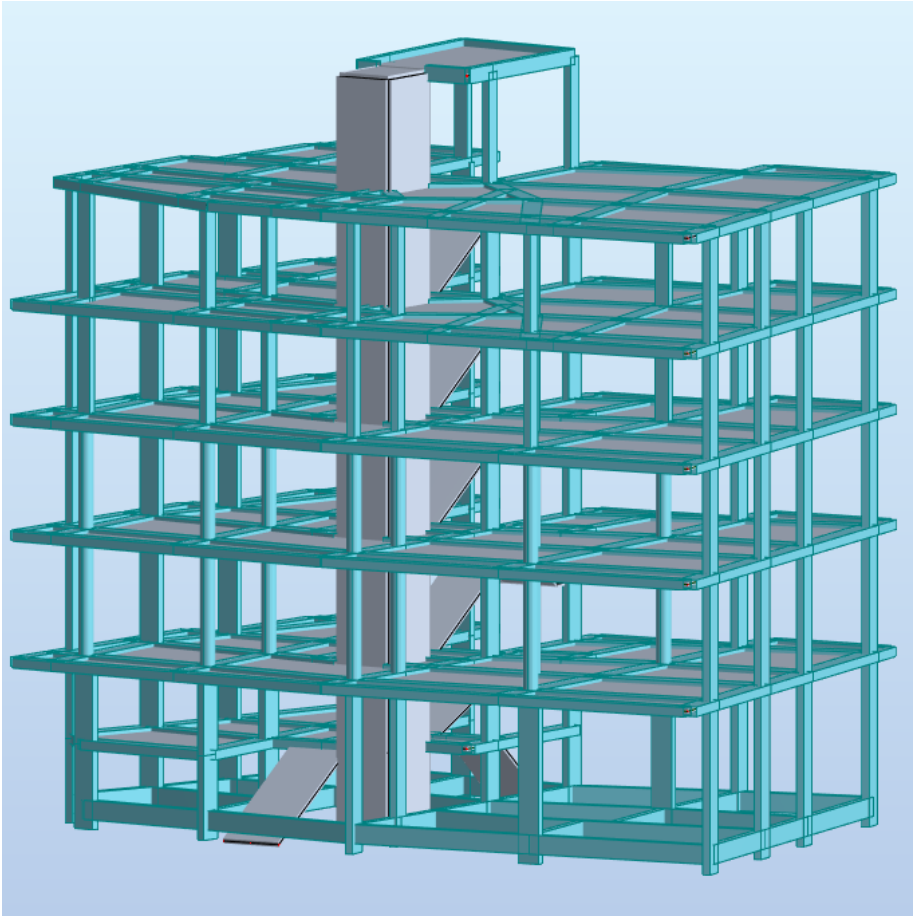
تــقرير مــبدئى للتقييم الإنــشائى
عمارة الــسيلينى - بنغازى

الـمهندس / رفـعت فـرج الـبركى



Rev. 00
09/2019

26/09/2019

تــقرير مبدئى للتقييم الإنشائى لعمارة السيلينى

المــستندات والمــعلومات المستلمة :

-نــسخة ورقية للمسقط الافقى المعمارى للدور الــثانى .
-نــسخة من ورقة الكلك لتسليح سقف الدور المتكرر بدون اى ابعاد وجداول لتسليح كمرات و بلاطات السقف المتكرر
-نــسخة اكترونية لمساقط معمارية (الاول ، الثانى ، الثالث) وواجهات معمارية بإبعاد و تصميم معمارى يختلف عن ماهو موضح فى النسخة الورقية .
-تم الكشف الجزئى لعدد قاعدتين طرفيتين حيث اظهرت قياسات الاجزاء المكشوفة من هذه القاعدتين بإن احدهما (500*1500*1500 m) بينما القاعدة الاخر تم قياس الجزء المكشوف منها والمتمثل فى رفرفة القاعدة من وجهه العمود (حوالى650 mm).

بمطابقة المستندات المستملة مع المنفذ فى الطبيعة اظهرت بإن النسخة الورقية للمسقط المعمارى للدور الثانى بإنها هى الاقرب الى الواقع المنفذ ، فى حين نسخة الكلاك لتسليح سقف الدور المكترر بدون اى ابعاد و جداول لتسليح لا يمكن الاستفادة منها بالاضافة الى كونها غير مطابقة للمعمارى المنفذ على الطبيعة

مــعايير التــحليل الانشــائى :

نــظرا لــعدم تــوفر اى مستندات وتصاميم معمارية وإنشائية سابقة للعمارة وعدم امكانية الكشف عند العناصر الانشائية بشكل كامل ودقيق وبالأخص القواعد
عليه تم استخدام الحد الادنى من متطلبات المواصفات الاوروبية (BS EN 1992-1-1:2004) وفقا لما يلى :

اجهاد الانضغاط للــخرسانة المــسلحة (C20/25)
اجهاد الخضوع لحديد التسليح (320 Mpa)
. الــغطاء الخرسانى للاعمدة .....(25mm)
.....الــغطاء الخرسانى للــقواعد .....(50 mm)
..... سـعة تــحمل الــتربة الامنه.....(200 KN/m2)

فى حين تم استخدام الحد الادنى من الاحمال وفقا للمواصفة الاوروبية المذكورة اعلاه ، وهى كما يلى :

الاحـــمال	الـوزن
وزن تشطيبات لبلاطة السطح	3.50 KN/m2
وزن تشطيبات لبلاطة الدور المتكرر	2.00 KN/m2
وزن البلوك الاجر لبلاطات الهوردى (سقف الدور الثالث والسطح)	0.90 KN/m2
وزن البلوك الاسمنتى لبلاطات الهوردى (باقى الطوابق)	1.80 KN/m2
وزن حـائط الدروة بالسطح (موزع على بلاطة السطح)	1.00 KN/m2
وزن حوائط المبانى بدور الميزانيين (موزع على بلاطة السقف)	3.00KN/m2
وزن حـوائط المبانى بالدور المتكرر (موزع على بلاطة السقف)	4.00KN/m2
وزن حـــوائط المبانى على الميد الارضية (طابق الدور الارضى)	11.00KN/m
وزن حـــوائط المبانى على الميد الارضية (طابق الميزانيين)	5.50KN/m
وزن الاحـمال الحية على بلاطة السطح	1.50KN/m2
وزن الاحـمال الحية على بلاطة الدور المتكرر والمزانيين	2.50KN/m2
وزن الاحـمال الحية على الـسلالم	4.00KN/m2

وعـلى ماتقدم تم اعداد النموذج الانشائى الثلاثى الابـعاد بإستخدام تقنية (Autodesk Robot Structural Analysis Professional 2020) ، وذلك وفقا لترخيص الممنوح لنا من الشركة الامريكية المنتجة لهذه التقنية (Autodesk Company).
حيث تم اعداد هذا النموذج وفقا للمعلومات المتوفرة لنا ومطابقة ما امكن مع ماهو منفذ فى الطبيعة ، وبإستخدام الحد الادنى من اشتراطات المواصفة الاوروبية
حيث تم تعريض النموذج الانشائى الى احمال استاتيكية (رآسية فقط) لدراسة سعة التحمل الانشائية للعناصر الناقلة للاحمال الراسية (الاعمدة) ، حيث تم دراسة اربع اعمدة (اثنان منهما عند القواعد المكشوفة واثنان اخران يمثلان اقصى احمال واقل احمال وذلك فى الطوابق (الارضى والاول والثالث) اى عند تغير قطاع العمود بإضافة الى دراسة سعة تحمل القواعد للاحمال الواقعة عليها ، وذلك للقاعدتتين التى تم الكشف الجزئى عليها .

تــحليل النتائج

بــعد اجراء التحليل الإنشائى للنموذج الثلاثى الابعاد وفقا للمعايير المذكورة اعلاه ، يمكن لتخليص نتائج هذا التحليل كما يلى :

العنصر الانشائى	الدور	رقم العنصر	الحالة	نسبة الفشل
	الدور الارضى			
		C469	غير امن	6%
		C479	امن	
		C483	امن	
		C468	غير امن	2%
الاعـمدة	الدور الاول			
		C511	غير امن	11%
		C521	امن	
		C525	امن	
		C510	غير امن	12%
	الدور الثالث			
		C553	امن	
		C563	امن	
		C567	امن	
		C552	امن	

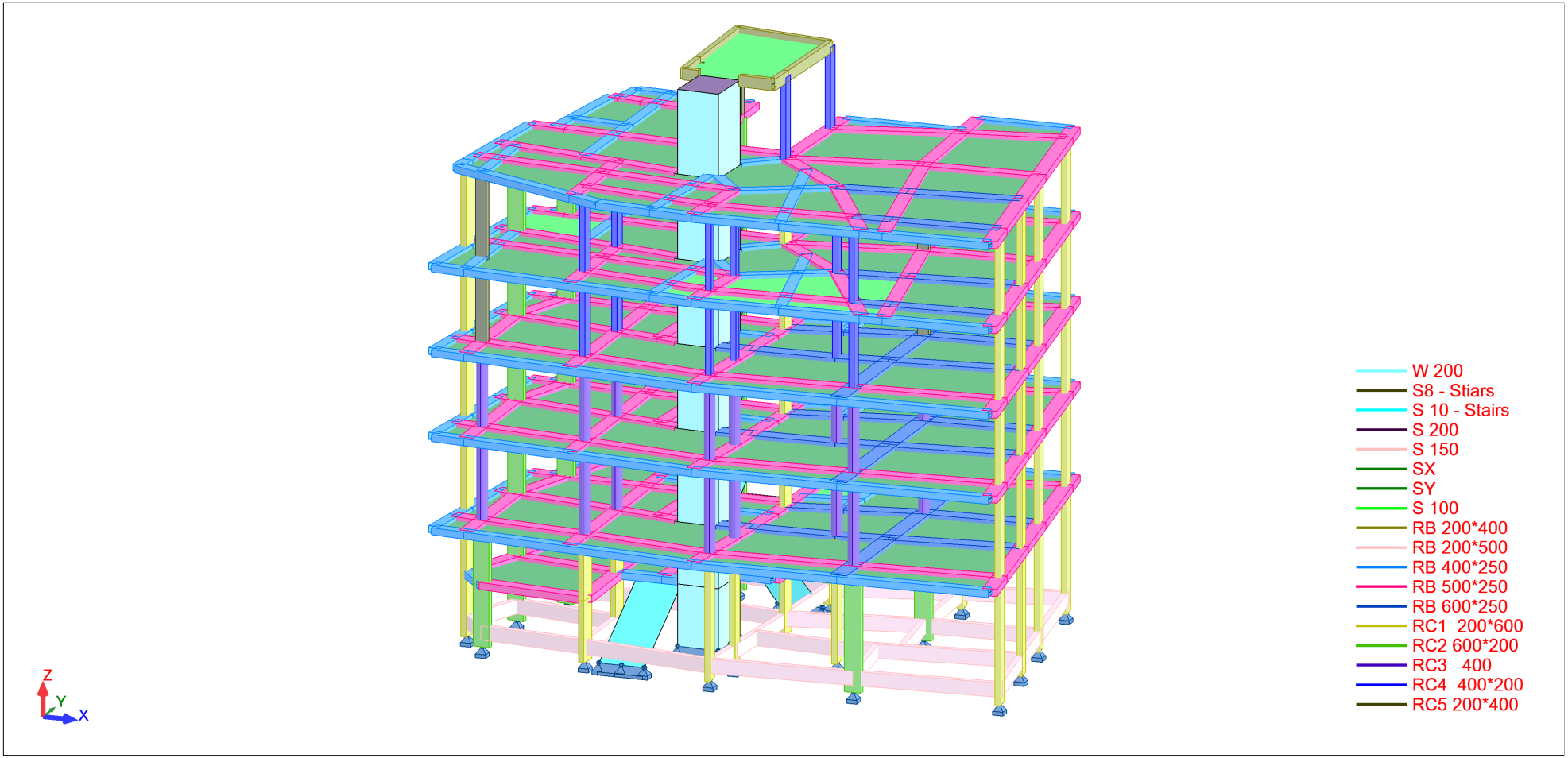
العنصر الانشائى	الدور	رقم العنصر	الحالة	نسبة الفشل
القــواعد				
		F365	غير امنه	46%
		F351	غير امنه	67%

ويـجدر التنــويه هــنا الى ان ترقيم العناصر المذكورة اعلاه وفقا لما هو وارد فى الحسابات التفصيلية بهذا التقرير .

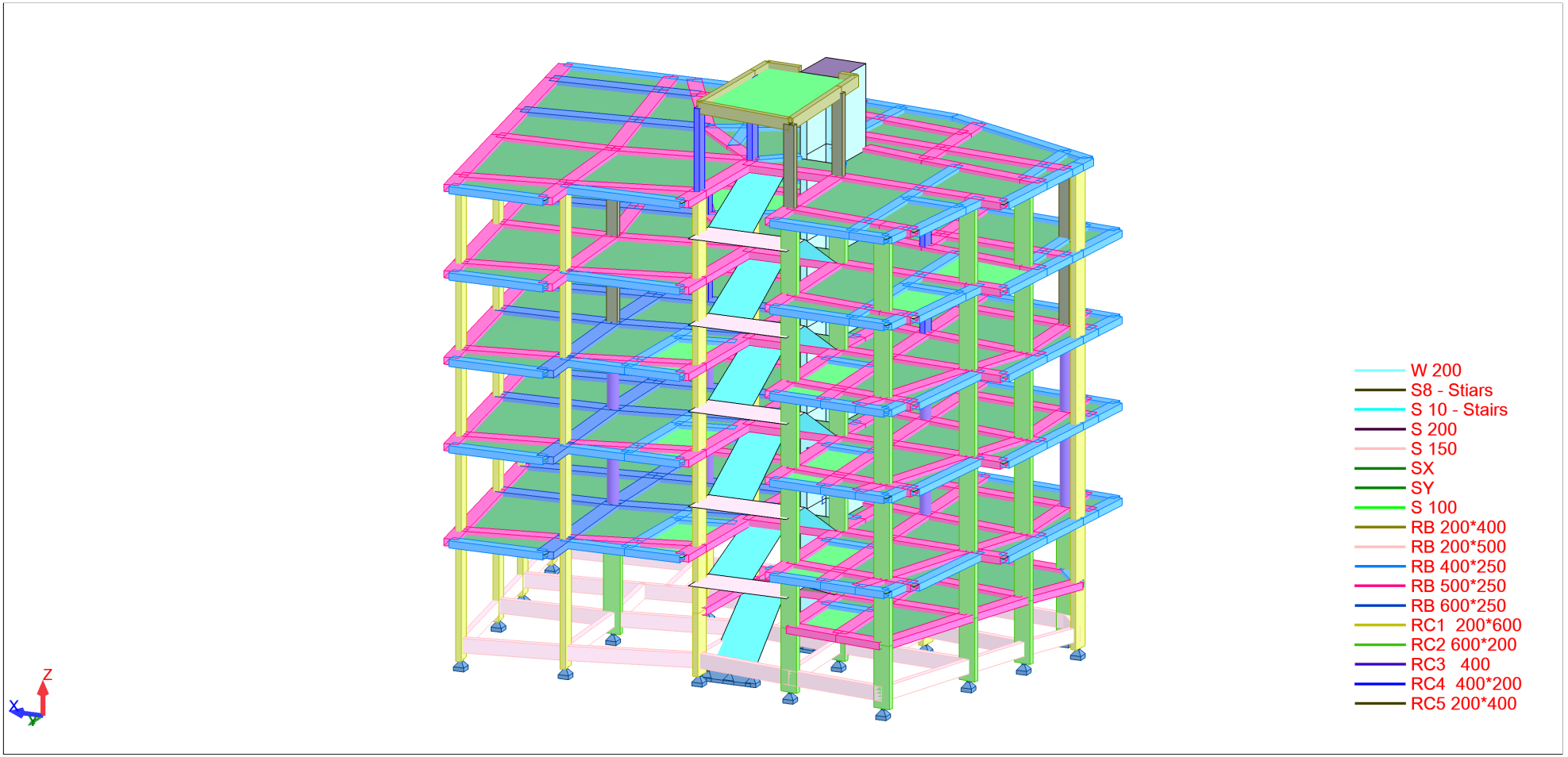
الـــتوصيات :

نـــوصى بإجـــراء دارســة تفصيلية للمبنى قبل اضــافة اى احــمال جديدة ، بحيث تتضمن الكـشف على جميع الـعناصر الإنشائية وبالإخص كافة القــواعد بالإضافة الى القيام بإجراء الاختبارات المعملية والحقلية اللازمة ، والتى يبنى عليها لايجاد الحلول الانشائية المناسبة للعناصر الإنشائية الغير امنه .

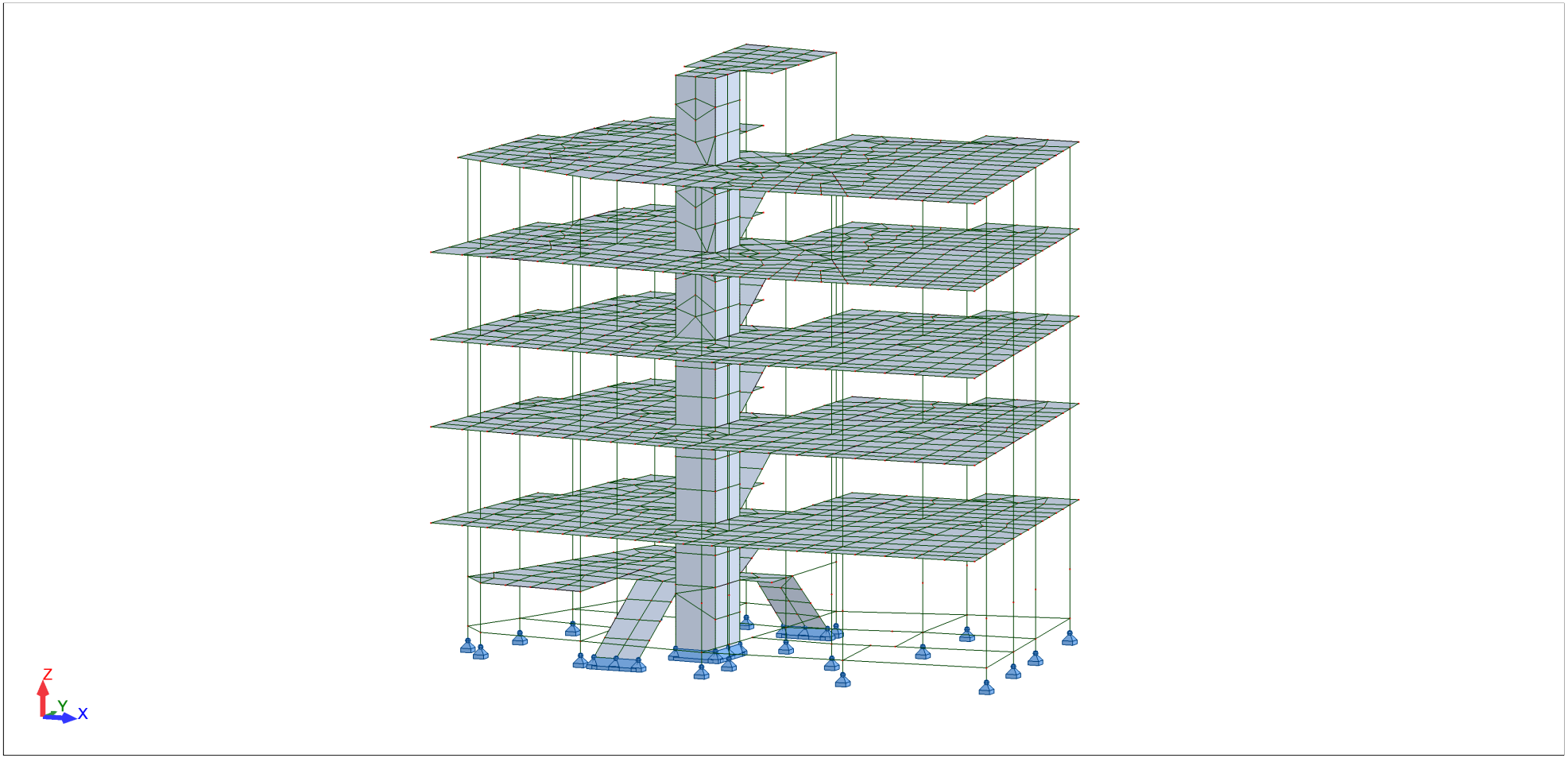
View 01


Z
Y
X
W 200
S8 - Stiars
S 10 - Stairs
S 200
S 150
SX
SY
S 100
RB 200*400
RB 200*500
RB 400*250
RB 500*250
RB 600*250
RC1 200*600
RC2 600*200
RC3 400
RC4 400*200
RC5 200*400

View 02


W 200
S8 - Stiars
S 10 - Stairs
S 200
S 150
SX
SY
S 100
RB 200*400
RB 200*500
RB 400*250
RB 500*250
RB 600*250
RC1 200*600
RC2 600*200
RC3 400
RC4 400*200
RC5 200*400
Z
X
Y

View 03



Load Cases

	Case	Case name	Load type	Load values
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
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	Case	Case name	Load type	Load values
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	2	Flooring - Roof floor	(FE) uniform	PZ=-3.50(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
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	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) planar on contour	PZ1=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) planar on contour	PZ1=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
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	3	Flooring - Typical floors	(FE) planar on contour	PZ1=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
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	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) planar on contour	PZ1=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) planar on contour	PZ1=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
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	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)

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	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
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	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) planar on contour	PZ1=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) planar on contour	PZ1=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)

	Case	Case name	Load type	Load values
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	3	Flooring - Typical floors	(FE) uniform	PZ=-2.00(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)

	Case	Case name	Load type	Load values
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)

	Case	Case name	Load type	Load values
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	4	Hollow Block - Red bricks	(FE) uniform	PZ=-0.90(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)

	Case	Case name	Load type	Load values
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)

	Case	Case name	Load type	Load values
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	5	Hollow Bolck - Bricks	(FE) uniform	PZ=-1.80(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)

	Case	Case name	Load type	Load values
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	10	Live load - Roof	(FE) uniform	PZ=-1.50(kN/m2)
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)
	11	Live load - Stiars	(FE) uniform	PZ=-4.00(kN/m2)
	11	Live load - Stiars	(FE) uniform	PZ=-4.00(kN/m2)
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)
	11	Live load - Stiars	(FE) uniform	PZ=-4.00(kN/m2)
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)
	11	Live load - Stiars	(FE) uniform	PZ=-4.00(kN/m2)
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)
	11	Live load - Stiars	(FE) uniform	PZ=-4.00(kN/m2)
	11	Live load - Stiars	(FE) uniform	PZ=-4.00(kN/m2)
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)
	11	Live load - Stiars	(FE) uniform	PZ=-4.00(kN/m2)
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)

	Case	Case name	Load type	Load values
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)
	11	Live load - Stiars	(FE) planar on contour	PZ1=-4.00(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)

	Case	Case name	Load type	Load values
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) planar on contour	PZ1=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)

	Case	Case name	Load type	Load values
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)

	Case	Case name	Load type	Load values
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	12	Live load - Typical floor	(FE) uniform	PZ=-2.50(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)

	Case	Case name	Load type	Load values
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	6	Parapet	(FE) uniform	PZ=-1.00(kN/m2)
	1	Self-weight	(FE) uniform	PZ=-1.84(kN/m2)
	1	Self-weight	(FE) uniform	PZ=-1.75(kN/m2)
	1	Self-weight	(FE) uniform	PZ=-1.84(kN/m2)

	Case	Case name	Load type	Load values
	1	Self-weight	(FE) uniform	PZ=-1.75(kN/m2)
	1	Self-weight	(FE) uniform	PZ=-1.84(kN/m2)
	1	Self-weight	self-weight	PZ Negative Factor
	1	Self-weight	(FE) uniform	PZ=-1.42(kN/m2)
	1	Self-weight	(FE) uniform	PZ=-1.75(kN/m2)
	1	Self-weight	(FE) uniform	PZ=-1.60(kN/m2)
	1	Self-weight	(FE) uniform	PZ=-1.75(kN/m2)
	1	Self-weight	(FE) uniform	PZ=-1.52(kN/m2)
	1	Self-weight	(FE) uniform	PZ=-1.90(kN/m2)
	1	Self-weight	(FE) uniform	PZ=-1.75(kN/m2)
	7	Walls - Bricks 150 mm - Meisnine level	(FE) uniform	PZ=-3.00(kN/m2)
	7	Walls - Bricks 150 mm - Meisnine level	(FE) uniform	PZ=-3.00(kN/m2)
	7	Walls - Bricks 150 mm - Meisnine level	(FE) uniform	PZ=-3.00(kN/m2)
	7	Walls - Bricks 150 mm - Meisnine level	(FE) uniform	PZ=-3.00(kN/m2)
	7	Walls - Bricks 150 mm - Meisnine level	trapezoidal load (2p)	PZ2=-4.40(kN/m) P
	7	Walls - Bricks 150 mm - Meisnine level	trapezoidal load (2p)	PZ2=-4.40(kN/m) P
	7	Walls - Bricks 150 mm - Meisnine level	(FE) uniform	PZ=-3.00(kN/m2)
	7	Walls - Bricks 150 mm - Meisnine level	(FE) uniform	PZ=-3.00(kN/m2)
	7	Walls - Bricks 150 mm - Meisnine level	trapezoidal load (2p)	PZ2=-4.40(kN/m) P
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)

	Case	Case name	Load type	Load values
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)

	Case	Case name	Load type	Load values
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)

	Case	Case name	Load type	Load values
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)

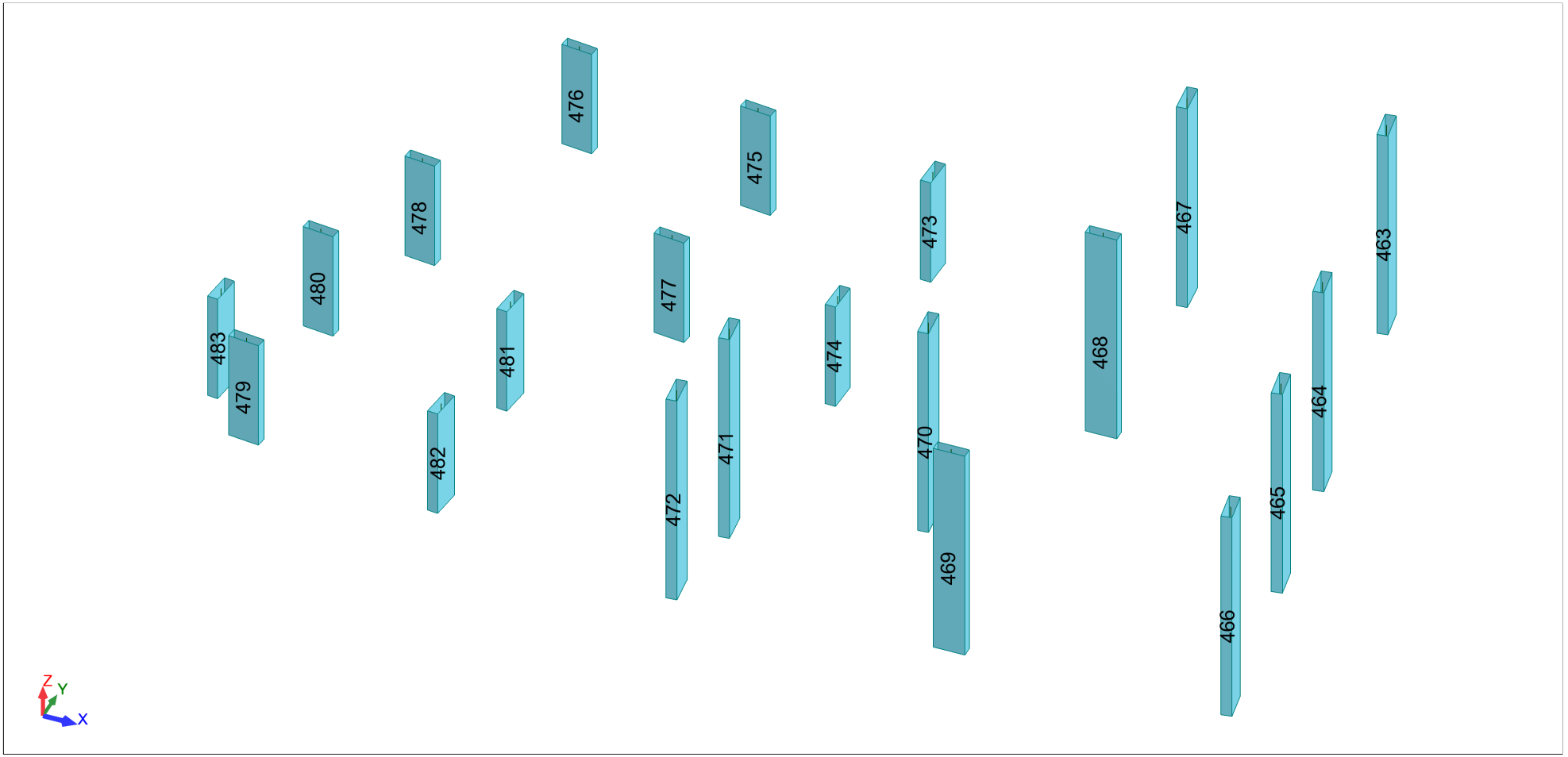
	Case	Case name	Load type	Load values
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	8	Walls - Bricks 150 mm - Typical Floors	(FE) uniform	PZ=-4.00(kN/m2)
	9	Walls - Tie Beams	uniform load	PZ=-5.50(kN/m)
	9	Walls - Tie Beams	uniform load	PZ=-11.00(kN/m)

Combination Cases

- Cases: 13 16 [EN 1990:2002]

Combinations/Comp.	Definition
ULS/ 1	1*1.35 + 2*1.35 + 3*1.35 + 4*1.35 + 5*1.35 + 6*1.35 + 7*1.35 + 8*1.35 + 10*1.50 + 11*1.50 + 12*1.50 + 9*1.35
ULS/ 2	1*1.35 + 2*1.35 + 3*1.35 + 4*1.35 + 5*1.35 + 6*1.35 + 7*1.35 + 8*1.35 + 9*1.35
ULS/ 3	1*1.00 + 10*1.50 + 11*1.50 + 12*1.50
ULS/ 4	1*1.00
SLS:QPR/ 1	1*1.00 + 2*1.00 + 3*1.00 + 4*1.00 + 5*1.00 + 6*1.00 + 7*1.00 + 8*1.00 + 10*0.30 + 11*0.30 + 12*0.30 + 9*1.00
SLS:QPR/ 2	1*1.00 + 2*1.00 + 3*1.00 + 4*1.00 + 5*1.00 + 6*1.00 + 7*1.00 + 8*1.00 + 9*1.00

Columns - Ground Floor Level



Columns - Ground Floor - +ULS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
469/ 351/ ULS+	2295.13	0.00	-0.00
468/ 349/ ULS+	2250.08	-0.00	-0.00
468/ 107/ ULS+	2203.20	0.00	0.00
469/ 106/ ULS+	2173.68	-0.00	0.00
467/ 347/ ULS+	1579.26	0.00	0.00
482/ 368/ ULS+	1515.13	0.00	0.00
477/ 363/ ULS+	1506.60	0.00	-0.00
470/ 353/ ULS+	1505.64	0.00	0.00
467/ 9/ ULS+	1478.88	0.00	0.00
470/ 102/ ULS+	1460.92	-0.00	0.00
477/ 42/ ULS+	1444.10	0.00	0.00
482/ 51/ ULS+	1428.70	-0.00	0.00
472/ 357/ ULS+	1368.45	-0.00	0.00
478/ 364/ ULS+	1340.77	0.00	-0.00
481/ 367/ ULS+	1321.07	0.00	-0.00
478/ 48/ ULS+	1279.91	0.00	0.00
481/ 49/ ULS+	1265.41	0.00	0.00
472/ 93/ ULS+	1252.10	0.00	-0.00
476/ 362/ ULS+	1242.11	0.00	-0.00
476/ 54/ ULS+	1196.76	-0.00	-0.00
474/ 360/ ULS+	1157.96	-0.00	-0.00
473/ 359/ ULS+	1102.79	-0.00	-0.00
479/ 365/ ULS+	1084.86	0.00	-0.00
479/ 39/ ULS+	1064.57	0.00	0.00
474/ 2/ ULS+	1061.11	0.00	-0.00
475/ 361/ ULS+	1060.15	0.00	-0.00
473/ 1/ ULS+	1008.98	-0.00	0.0
475/ 45/ ULS+	977.87	-0.00	0.00
466/ 345/ ULS+	942.45	0.0	0.00
466/ 91/ ULS+	850.82	-0.00	0.00
464/ 341/ ULS+	846.35	-0.00	0.00

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
480/ 366/ ULS+	827.78	0.00	-0.00
465/ 343/ ULS+	796.99	-0.00	0.00
480/ 50/ ULS+	783.93	0.00	0.00
464/ 89/ ULS+	751.26	0.00	0.00
465/ 90/ ULS+	706.56	0.00	-0.00
463/ 339/ ULS+	649.62	-0.00	0.00
463/ 88/ ULS+	564.13	0.00	0.00
471/ 355/ ULS+	536.07	-0.00	0.00
471/ 6/ ULS+	446.50	0.00	0.00
483/ 369/ ULS+	130.82	0.00	-0.00
483/ 40/ ULS+	92.35	0.00	-0.00

Columns - Ground Floor - -ULS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
469/ 351/ ULS-	627.69	0.00	-0.00
469/ 106/ ULS-	596.62	-0.00	0.00
468/ 349/ ULS-	557.96	-0.00	-0.00
468/ 107/ ULS-	521.31	-0.00	0.00
477/ 363/ ULS-	467.77	0.00	-0.00
467/ 347/ ULS-	459.41	-0.00	-0.00
477/ 42/ ULS-	444.97	0.00	0.00
467/ 9/ ULS-	432.20	0.00	0.00
482/ 368/ ULS-	421.69	0.00	-0.00
476/ 362/ ULS-	413.89	0.00	-0.00
478/ 364/ ULS-	403.73	0.00	-0.00
472/ 357/ ULS-	403.72	-0.00	0.00
482/ 51/ ULS-	402.23	-0.00	-0.00
476/ 54/ ULS-	399.24	-0.00	-0.00
470/ 353/ ULS-	389.33	0.00	0.00
478/ 48/ ULS-	381.70	-0.00	0.00
472/ 93/ ULS-	378.44	0.00	-0.00
473/ 359/ ULS-	370.47	-0.00	-0.00
474/ 360/ ULS-	359.55	-0.00	-0.00
470/ 102/ ULS-	357.72	-0.00	0.00
475/ 361/ ULS-	354.96	0.00	-0.00
473/ 1/ ULS-	353.77	-0.00	-0.00
481/ 367/ ULS-	345.96	0.00	-0.00
475/ 45/ ULS-	334.35	-0.00	0.00
474/ 2/ ULS-	331.45	0.00	-0.00
479/ 365/ ULS-	326.00	-0.00	-0.00
481/ 49/ ULS-	324.95	0.00	0.00
479/ 39/ ULS-	317.40	-0.00	-0.00
466/ 345/ ULS-	291.69	-0.00	-0.00
466/ 91/ ULS-	268.63	-0.00	-0.00
480/ 366/ ULS-	257.87	0.00	-0.00

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
480/ 50/ ULS-	239.40	-0.00	-0.00
464/ 341/ ULS-	236.86	-0.00	0.00
465/ 343/ ULS-	228.55	-0.00	0.00
463/ 339/ ULS-	211.23	-0.00	0.00
464/ 89/ ULS-	209.89	-0.00	-0.00
465/ 90/ ULS-	198.96	0.00	-0.00
463/ 88/ ULS-	189.04	-0.00	-0.00
471/ 355/ ULS-	152.36	-0.00	0.00
471/ 6/ ULS-	127.40	-0.00	0.00
483/ 369/ ULS-	97.30	0.00	-0.00
483/ 40/ ULS-	79.93	-0.00	-0.00

Columns - Ground Floor - +SLS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
469/ 351/ SLS+	1503.16	0.00	-0.00
468/ 349/ SLS+	1451.45	-0.00	-0.00
468/ 107/ SLS+	1416.26	0.00	0.00
469/ 106/ SLS+	1412.99	-0.00	0.00
467/ 347/ SLS+	1040.16	-0.00	-0.00
482/ 368/ SLS+	996.57	0.00	-0.00
470/ 353/ SLS+	975.24	0.00	0.00
467/ 9/ SLS+	965.82	0.00	0.00
470/ 102/ SLS+	942.14	-0.00	0.00
477/ 363/ SLS+	941.50	0.00	-0.00
482/ 51/ SLS+	932.06	-0.00	-0.00
472/ 357/ SLS+	908.11	-0.00	0.00
477/ 42/ SLS+	894.95	0.00	0.00
478/ 364/ SLS+	880.33	0.00	-0.00
481/ 367/ SLS+	851.25	0.00	-0.00
478/ 48/ SLS+	835.21	-0.00	0.00
476/ 362/ SLS+	822.77	0.00	-0.00
472/ 93/ SLS+	821.39	0.00	-0.00
481/ 49/ SLS+	810.18	0.00	0.00
476/ 54/ SLS+	788.91	-0.00	-0.00
474/ 360/ SLS+	737.32	-0.00	-0.00
479/ 365/ SLS+	709.55	0.00	-0.00
473/ 359/ SLS+	701.45	-0.00	-0.00
479/ 39/ SLS+	692.63	-0.00	0.00
475/ 361/ SLS+	677.33	0.00	-0.00
474/ 2/ SLS+	666.69	0.00	-0.00
473/ 1/ SLS+	632.05	-0.00	-0.00
466/ 345/ SLS+	628.53	-0.00	0.00
475/ 45/ SLS+	616.55	-0.00	0.00
466/ 91/ SLS+	560.62	-0.00	0.00
464/ 341/ SLS+	560.49	-0.00	0.00

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
480/ 366/ SLS+	543.47	0.00	-0.00
465/ 343/ SLS+	528.02	-0.00	0.00
480/ 50/ SLS+	511.38	0.00	-0.00
464/ 89/ SLS+	490.16	-0.00	-0.00
465/ 90/ SLS+	461.10	0.00	-0.00
463/ 339/ SLS+	437.78	-0.00	0.00
463/ 88/ SLS+	374.60	0.00	-0.00
471/ 355/ SLS+	360.95	-0.00	0.00
471/ 6/ SLS+	295.58	0.00	0.00
483/ 369/ SLS+	96.90	0.00	-0.00
483/ 40/ SLS+	68.41	0.00	-0.00

Columns - Ground Floor - -SLS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
469/ 351/ SLS-	1430.32	0.00	-0.00
468/ 349/ SLS-	1371.83	-0.00	-0.00
469/ 106/ SLS-	1340.07	-0.00	0.00
468/ 107/ SLS-	1336.47	0.00	0.00
467/ 347/ SLS-	992.20	-0.00	-0.00
482/ 368/ SLS-	950.06	0.00	-0.00
470/ 353/ SLS-	923.44	0.00	0.00
467/ 9/ SLS-	917.86	0.00	0.00
470/ 102/ SLS-	890.35	-0.00	0.00
482/ 51/ SLS-	885.36	-0.00	-0.00
477/ 363/ SLS-	876.96	0.00	-0.00
472/ 357/ SLS-	869.06	-0.00	0.00
478/ 364/ SLS-	838.60	0.00	-0.00
477/ 42/ SLS-	830.32	0.00	0.00
481/ 367/ SLS-	804.16	0.00	-0.00
478/ 48/ SLS-	793.47	-0.00	0.00
476/ 362/ SLS-	786.77	0.00	-0.00
472/ 93/ SLS-	782.16	0.00	-0.00
481/ 49/ SLS-	763.15	0.00	0.00
476/ 54/ SLS-	752.82	-0.00	-0.00
474/ 360/ SLS-	692.77	-0.00	-0.00
479/ 365/ SLS-	674.76	0.00	-0.00
473/ 359/ SLS-	658.76	-0.00	-0.00
479/ 39/ SLS-	657.14	-0.00	0.00
475/ 361/ SLS-	637.40	0.00	-0.00
474/ 2/ SLS-	622.56	0.00	-0.00
466/ 345/ SLS-	602.79	-0.00	0.00
473/ 1/ SLS-	589.39	-0.00	-0.00
475/ 45/ SLS-	576.68	-0.00	0.00
464/ 341/ SLS-	535.92	-0.00	0.00
466/ 91/ SLS-	534.87	-0.00	0.00

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
480/ 366/ SLS-	517.70	0.00	-0.00
465/ 343/ SLS-	504.96	-0.00	0.00
480/ 50/ SLS-	485.74	-0.00	-0.00
464/ 89/ SLS-	465.62	-0.00	-0.00
465/ 90/ SLS-	438.07	0.00	-0.00
463/ 339/ SLS-	421.72	-0.00	0.00
463/ 88/ SLS-	358.60	0.00	-0.00
471/ 355/ SLS-	347.58	-0.00	0.00
471/ 6/ SLS-	282.58	0.00	0.00
483/ 369/ SLS-	96.82	0.00	-0.00
483/ 40/ SLS-	67.73	0.00	-0.00

Column 469 - Calculation Report

1 Level:

- Name : Level +4.40
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.13
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column469 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1	Rectangular	600 x 200 (mm)
2.2.2	Height: L	= 4.00 (m)
2.2.3	Slab thickness	= 0.11 (m)
2.2.4	Beam height	= 0.25 (m)
2.2.5	Cover	= 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005
- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

Unsatisfactory load capacity of the column.
The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 0.94 < 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009 (B)
Combination type: ULS
Internal forces:
Nsd = 1430.81 (kN) Msdy = 0.00 (kN*m) Msdz = 0.00 (kN*m)
Design forces:
Lower node
N = 1430.81 (kN) N*etotz = 28.62 (kN*m) N*etoty= 28.62 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	0 (mm)	0 (mm)
Imperfection	ei:	10 (mm)	10 (mm)
I order (e0 + ei)	e0Ed:	10 (mm)	10 (mm)
II order	e2:	0 (mm)	0 (mm)
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	20 (mm)	20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account

M0 = 0.00 (kN*m)
ea = θ1*lo/2 = 10 (mm)
θ1 = θo * αη * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 14.31 (kN*m)
MEdmin = 28.62 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 28.62 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M0 = 0.00 (kN*m)
ea = θ1*lo/2 = 10 (mm)
θ1 = θo * αh * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 14.31 (kN*m)
MEdmin = 28.62 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 28.62 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 1539 (mm2)
Ratio:	ρ = 1.28 %

2.5 Reinforcement:

Main bars (HA 320):

- 10 ϕ14 l = 3.97 (m)

Transversal reinforcement: (HA 320):

stirrups:	24 ϕ8	l = 1.48 (m)
pins	72 ϕ8	l = 0.38 (m)

3 Material survey:

- Concrete volume = 0.45 (m3)
- Formwork = 6.00 (m2)

- Steel HA 320
  - Total weight = 72.81 (kG)
  - Density = 161.80 (kG/m3)
  - Average diameter= 10.3 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	63.03	24.88
14	39.65	47.93

Column479 - Calculation Report

1 Level:

- Name :
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.13
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column479 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1	Rectangular	600 x 200 (mm)
2.2.2	Height: L	= 2.33 (m)
2.2.3	Slab thickness	= 0.11 (m)
2.2.4	Beam height	= 0.25 (m)
2.2.5	Cover	= 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005
- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 1.23 > 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012 (C)
Combination type: ULS
Internal forces:
Nsd = 1093.89 (kN) Msdy = -3.24 (kN*m) Msdz = -13.07 (kN*m)
Design forces:
Cross-section in the middle of the column
N = 1093.89 (kN) N*etotz = -21.88 (kN*m) N*etoty= -21.88 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	-3 (mm)	-12 (mm)
Imperfection	ei:	6 (mm)	6 (mm)
I order (e0 + ei)	e0Ed:	3 (mm)	-6 (mm)
II order	e2:	0 (mm)	0 (mm)
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	-20 (mm)	-20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m) MC = -3.24 (kN*m)
Case: Cross-section in the middle of the column, Slenderness not taken into account
M0 = -3.24 (kN*m)
ea = $\theta 1$*lo/2 = 6 (mm)

$\theta 1 = \theta o * \alpha \eta * \alpha m = 0.01$
$\theta o = 0.01$
$\alpha h = 1.00$
$\alpha m = (0,5(1+1/m))^{0.5} = 1.00$
m = 1.00
Ma = N*ea = 6.02 (kN*m)
MEdmin = 21.88 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = -21.88 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m) MC = -13.07 (kN*m)
Case: Cross-section in the middle of the column, Slenderness not taken into account
M0 = -13.07 (kN*m)
ea = $\theta 1$*lo/2 = 6 (mm)
$\theta 1 = \theta o * \alpha h * \alpha m = 0.01$
$\theta o = 0.01$
$\alpha h = 1.00$
$\alpha m = (0,5(1+1/m))^{0.5} = 1.00$
m = 1.00
Ma = N*ea = 6.02 (kN*m)
MEdmin = 21.88 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = -21.88 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 1539 (mm2)
Ratio:	ρ = 1.28 %

2.5 Reinforcement:

Main bars (HA 320):

- 10 ϕ14 l = 2.29 (m)

Transversal reinforcement: (HA 320):

stirrups:	16 ϕ8	l = 1.48 (m)
pins	48 ϕ8	l = 0.38 (m)

3 Material survey:

- Concrete volume = 0.25 (m3)
- Formwork = 3.32 (m2)

- Steel HA 320
  - Total weight = 44.27 (kG)
  - Density = 177.78 (kG/m3)
  - Average diameter= 10.1 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	42.02	16.59
14	22.90	27.68

Column 483 - Calculation Report

1 Level:

- Name :
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.13
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column483 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1	Rectangular	200 x 600 (mm)
2.2.2	Height: L	= 2.33 (m)
2.2.3	Slab thickness	= 0.11 (m)
2.2.4	Beam height	= 0.25 (m)
2.2.5	Cover	= 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005
- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 7.04 > 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012 (C)
Combination type: ULS
Internal forces:
Nsd = 130.38 (kN) Msdy = -10.87 (kN*m) Msdz = -3.67 (kN*m)
Design forces:
Cross-section in the middle of the column
N = 130.38 (kN) N*etotz = -10.87 (kN*m) N*etoty= -4.38 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	-83 (mm)	-28 (mm)
Imperfection	ei:	0 (mm)6 (mm)	
I order (e0 + ei)	e0Ed:	-83 (mm)	-23 (mm)
II order	e2:	0 (mm)0 (mm)	
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	-83 (mm)	-34 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m) MC = -10.87 (kN*m)
Case: Cross-section in the middle of the column, Slenderness not taken into account
M0 = -10.87 (kN*m)
ea = 0 (mm)

Ma = N*ea = 0.00 (kN*m)
MEdmin = 2.61 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = -10.87 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m) MC = -3.67 (kN*m)
Case: Cross-section in the middle of the column, Slenderness not taken into account
M0 = -3.67 (kN*m)
ea = $\theta 1$*lo/2 = 6 (mm)
$\theta 1 = \theta o * \alpha h * \alpha m = 0.01$
$\theta o = 0.01$
$\alpha h = 1.00$
$\alpha m = (0,5(1+1/m))^{0.5} = 1.00$
m = 1.00
Ma = N*ea = 0.72 (kN*m)
MEdmin = 2.61 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = -4.38 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 1539 (mm2)
Ratio:	ρ = 1.28 %

2.5 Reinforcement:

Main bars (HA 320):

- 10 ϕ14 l = 2.29 (m)

Transversal reinforcement: (HA 320):

stirrups:	16 ϕ8	l = 1.48 (m)
pins	48 ϕ8	l = 0.38 (m)

3 Material survey:

- Concrete volume = 0.25 (m3)

- Formwork = 3.32 (m2)

- Steel HA 320
  - Total weight = 44.27 (kG)
  - Density = 177.78 (kG/m3)
  - Average diameter= 10.1 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	42.02	16.59
14	22.90	27.68

Column 468 - Calculation Report

1 Level:

- Name : Level +4.40
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.13
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column468 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1	Rectangular	600 x 200 (mm)
2.2.2	Height: L	= 4.00 (m)
2.2.3	Slab thickness	= 0.11 (m)
2.2.4	Beam height	= 0.25 (m)
2.2.5	Cover	= 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005
- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

Unsatisfactory load capacity of the column.
The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 0.98 < 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009 (C)
Combination type: ULS
Internal forces:
Nsd = 1373.33 (kN) Msdy = -0.09 (kN*m) Msdz = 0.89 (kN*m)
Design forces:
Cross-section in the middle of the column
N = 1373.33 (kN) N*etotz = -27.47 (kN*m) N*etoty= 27.47 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	-0 (mm)	1 (mm)
Imperfection	ei:	10 (mm)	10 (mm)
I order (e0 + ei)	e0Ed:	10 (mm)	11 (mm)
II order	e2:	0 (mm)0 (mm)	
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	-20 (mm)	20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m) MC = -0.09 (kN*m)
Case: Cross-section in the middle of the column, Slenderness not taken into account

M0 = -0.09 (kN*m)
ea = θ1*lo/2 = 10 (mm)
θ1 = θo * αη * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 13.73 (kN*m)
MEdmin = 27.47 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = -27.47 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m) MC = 0.89 (kN*m)
Case: Cross-section in the middle of the column, Slenderness not taken into account
M0 = 0.89 (kN*m)
ea = θ1*lo/2 = 10 (mm)
θ1 = θo * αh * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 13.73 (kN*m)
MEdmin = 27.47 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 27.47 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 1539 (mm2)
Ratio:	ρ = 1.28 %

2.5 Reinforcement:

Main bars (HA 320):

- 10 ϕ14 l = 3.97 (m)

Transversal reinforcement: (HA 320):

stirrups:	24 ϕ8	l = 1.48 (m)
pins	72 ϕ8	l = 0.38 (m)

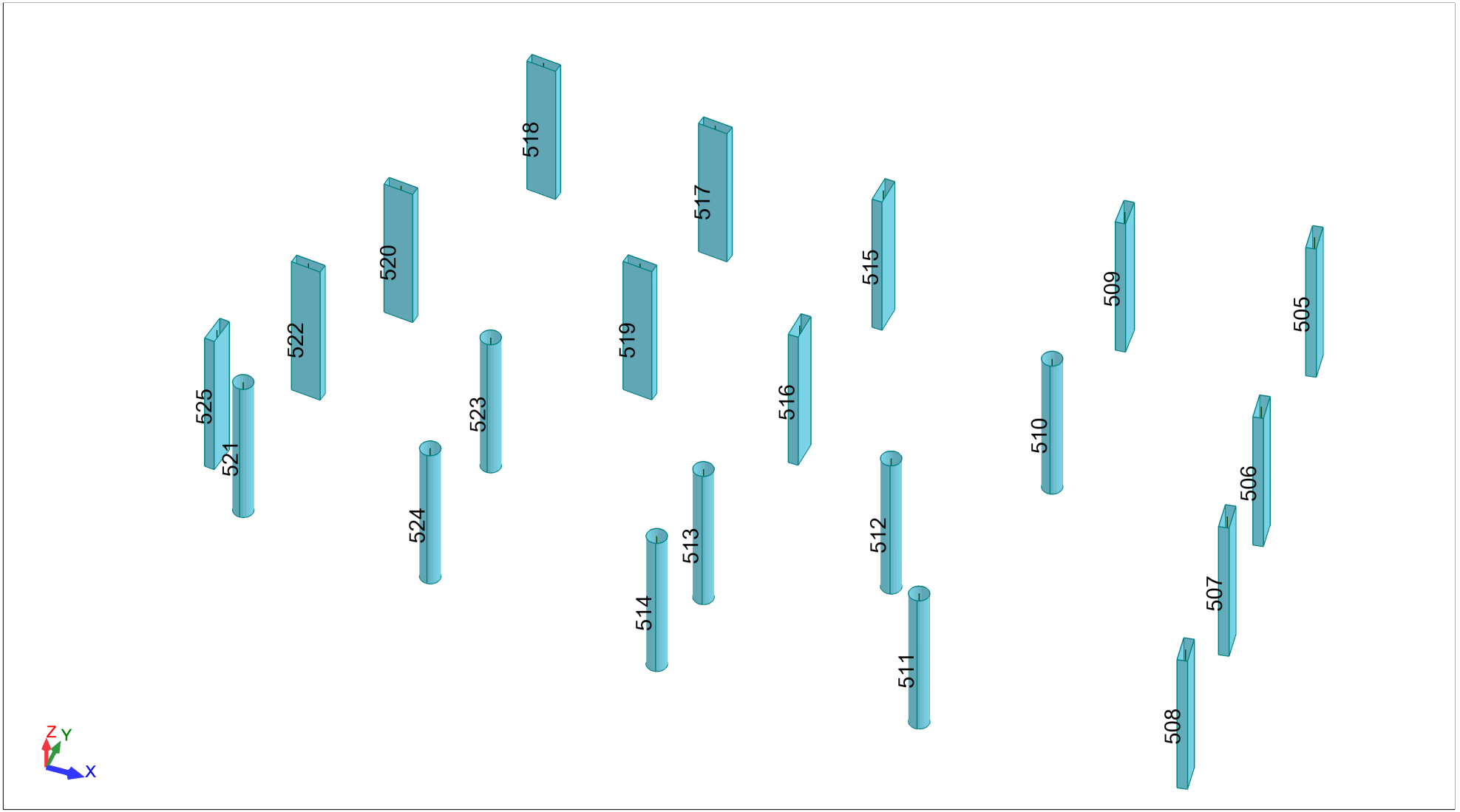
3 Material survey:

- Concrete volume = 0.45 (m3)
- Formwork = 6.00 (m2)

- Steel HA 320
  - Total weight = 72.81 (kG)
  - Density = 161.80 (kG/m3)
  - Average diameter= 10.3 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	63.03	24.88
14	39.65	47.93

Columns - First Floor Level



Columns - First Floor Level - +ULS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
510/ 107/ ULS+	1723.59	0.0	0.0
511/ 106/ ULS+	1718.11	0.0	0.0
510/ 158/ ULS+	1709.85	0.00	0.00
511/ 157/ ULS+	1704.38	0.00	-0.00
512/ 102/ ULS+	1176.62	0.0	0.0
509/ 9/ ULS+	1173.26	0.0	0.0
512/ 153/ ULS+	1162.88	0.00	0.00
509/ 17/ ULS+	1160.14	0.0	0.00
524/ 73/ ULS+	1084.52	0.0	0.0
524/ 124/ ULS+	1070.78	0.00	0.00
514/ 93/ ULS+	986.00	0.0	0.0
514/ 144/ ULS+	972.27	0.00	0.00
518/ 4/ ULS+	893.34	0.0	0.0
519/ 58/ ULS+	891.28	0.0	0.0
520/ 66/ ULS+	882.27	0.0	0.0
518/ 12/ ULS+	880.23	-0.00	-0.00
519/ 110/ ULS+	878.16	-0.00	0.00
520/ 117/ ULS+	869.16	0.00	0.00
516/ 7/ ULS+	846.59	0.0	0.0
523/ 70/ ULS+	840.59	0.0	0.0
516/ 15/ ULS+	833.48	0.00	0.0
523/ 121/ ULS+	826.86	-0.00	-0.00
515/ 8/ ULS+	816.21	0.0	0.0
517/ 3/ ULS+	748.86	0.0	0.0
515/ 16/ ULS+	747.47	-0.00	0.00
521/ 74/ ULS+	734.80	0.0	0.0
521/ 125/ ULS+	721.07	0.00	0.00
517/ 11/ ULS+	704.31	0.00	-0.00
508/ 91/ ULS+	684.62	0.0	0.0
508/ 142/ ULS+	671.51	-0.00	0.00
506/ 89/ ULS+	605.51	0.0	0.0
506/ 140/ ULS+	592.39	0.00	0.00

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
507/ 90/ ULS+	568.14	0.0	0.0
507/ 141/ ULS+	555.02	0.00	0.00
522/ 71/ ULS+	553.48	0.0	0.0
522/ 122/ ULS+	540.37	-0.00	-0.00
505/ 88/ ULS+	457.25	0.0	0.0
505/ 139/ ULS+	444.14	-0.00	0.00
513/ 6/ ULS+	378.37	0.0	0.0
513/ 14/ ULS+	364.64	0.00	0.00
525/ 83/ ULS+	112.54	0.0	0.0
525/ 134/ ULS+	99.42	-0.00	-0.00

Columns - First Floor Level - -ULS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
511/ 106/ ULS-	486.75	0.0	0.0
511/ 157/ ULS-	476.57	-0.00	-0.00
510/ 107/ ULS-	416.67	0.0	0.0
510/ 158/ ULS-	406.50	-0.00	0.00
509/ 9/ ULS-	349.75	0.0	0.0
509/ 17/ ULS-	340.04	-0.00	0.00
524/ 73/ ULS-	308.79	0.0	0.0
514/ 93/ ULS-	308.77	0.0	0.0
518/ 4/ ULS-	300.35	0.0	0.0
512/ 102/ ULS-	299.51	0.0	0.0
524/ 124/ ULS-	298.62	0.00	-0.00
514/ 144/ ULS-	298.59	0.0	0.00
518/ 12/ ULS-	290.63	-0.00	-0.00
512/ 153/ ULS-	289.34	-0.00	0.0
515/ 8/ ULS-	287.94	0.0	0.0
519/ 58/ ULS-	278.73	0.0	0.0
516/ 7/ ULS-	269.28	0.0	0.0
519/ 110/ ULS-	269.02	-0.00	0.00
520/ 66/ ULS-	267.20	0.0	0.0
515/ 16/ ULS-	262.30	-0.00	0.00
516/ 15/ ULS-	259.57	0.00	-0.00
517/ 3/ ULS-	258.35	0.0	0.0
520/ 117/ ULS-	257.48	0.00	-0.00
517/ 11/ ULS-	239.70	-0.00	-0.00
508/ 91/ ULS-	223.62	0.0	0.0
521/ 74/ ULS-	222.95	0.0	0.0
523/ 70/ ULS-	217.50	0.0	0.0
508/ 142/ ULS-	213.91	-0.00	-0.00
521/ 125/ ULS-	212.77	0.00	-0.00
523/ 121/ ULS-	207.33	-0.00	-0.00
506/ 89/ ULS-	175.87	0.0	0.0
522/ 71/ ULS-	173.45	0.0	0.0

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
507/ 90/ ULS-	166.73	0.0	0.0
506/ 140/ ULS-	166.16	-0.00	0.00
522/ 122/ ULS-	163.74	-0.00	-0.00
505/ 88/ ULS-	159.10	0.0	0.0
507/ 141/ ULS-	157.02	-0.00	0.00
505/ 139/ ULS-	149.39	-0.00	-0.00
513/ 6/ ULS-	114.47	0.0	0.0
513/ 14/ ULS-	104.30	0.00	0.00
525/ 83/ ULS-	75.52	0.0	0.0
525/ 134/ ULS-	65.81	-0.00	-0.00

Columns - First Floor Level - +SLS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
511/ 106/ SLS+	1119.16	0.0	0.0
510/ 107/ SLS+	1109.71	0.0	0.0
511/ 157/ SLS+	1108.99	-0.00	-0.00
510/ 158/ SLS+	1099.54	0.00	0.00
509/ 9/ SLS+	767.58	0.0	0.0
512/ 102/ SLS+	760.45	0.0	0.0
509/ 17/ SLS+	757.87	-0.00	0.00
512/ 153/ SLS+	750.28	-0.00	0.00
524/ 73/ SLS+	708.94	0.0	0.0
524/ 124/ SLS+	698.77	0.00	-0.00
514/ 93/ SLS+	648.65	0.0	0.0
514/ 144/ SLS+	638.48	0.00	0.00
518/ 4/ SLS+	590.71	0.0	0.0
518/ 12/ SLS+	580.99	-0.00	-0.00
520/ 66/ SLS+	579.78	0.0	0.0
520/ 117/ SLS+	570.06	0.00	-0.00
519/ 58/ SLS+	559.83	0.0	0.0
519/ 110/ SLS+	550.11	-0.00	0.00
523/ 70/ SLS+	545.73	0.0	0.0
523/ 121/ SLS+	535.56	-0.00	-0.00
516/ 7/ SLS+	533.44	0.0	0.0
516/ 15/ SLS+	523.73	0.00	-0.00
515/ 8/ SLS+	511.23	0.0	0.0
521/ 74/ SLS+	480.32	0.0	0.0
517/ 3/ SLS+	472.93	0.0	0.0
515/ 16/ SLS+	471.69	-0.00	0.00
521/ 125/ SLS+	470.15	0.00	-0.00
508/ 91/ SLS+	452.49	0.0	0.0
517/ 11/ SLS+	447.41	0.00	-0.00
508/ 142/ SLS+	442.77	-0.00	0.00
506/ 89/ SLS+	396.27	0.0	0.0
506/ 140/ SLS+	386.56	0.00	0.00

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
507/ 90/ SLS+	372.01	0.0	0.0
522/ 71/ SLS+	364.34	0.0	0.0
507/ 141/ SLS+	362.30	0.00	0.00
522/ 122/ SLS+	354.62	-0.00	-0.00
505/ 88/ SLS+	304.69	0.0	0.0
505/ 139/ SLS+	294.97	-0.00	-0.00
513/ 6/ SLS+	251.64	0.0	0.0
513/ 14/ SLS+	241.47	0.00	0.00
525/ 83/ SLS+	80.55	0.0	0.0
525/ 134/ SLS+	70.83	-0.00	-0.00

Columns - First Floor Level - -SLS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
511/ 106/ SLS-	1062.38	0.0	0.0
511/ 157/ SLS-	1052.21	-0.00	-0.00
510/ 107/ SLS-	1047.94	0.0	0.0
510/ 158/ SLS-	1037.77	0.00	0.00
509/ 9/ SLS-	730.04	0.0	0.0
509/ 17/ SLS-	720.33	-0.00	0.00
512/ 102/ SLS-	719.35	0.0	0.0
512/ 153/ SLS-	709.18	-0.00	0.00
524/ 73/ SLS-	674.02	0.0	0.0
524/ 124/ SLS-	663.85	0.00	-0.00
514/ 93/ SLS-	618.43	0.0	0.0
514/ 144/ SLS-	608.26	0.00	0.00
518/ 4/ SLS-	564.44	0.0	0.0
518/ 12/ SLS-	554.72	-0.00	-0.00
520/ 66/ SLS-	552.49	0.0	0.0
520/ 117/ SLS-	542.78	0.00	-0.00
519/ 58/ SLS-	522.70	0.0	0.0
523/ 70/ SLS-	517.28	0.0	0.0
519/ 110/ SLS-	512.99	-0.00	0.00
523/ 121/ SLS-	507.11	-0.00	-0.00
516/ 7/ SLS-	498.80	0.0	0.0
516/ 15/ SLS-	489.09	0.00	-0.00
515/ 8/ SLS-	476.70	0.0	0.0
521/ 74/ SLS-	456.66	0.0	0.0
521/ 125/ SLS-	446.49	0.00	-0.00
517/ 3/ SLS-	442.68	0.0	0.0
515/ 16/ SLS-	441.36	-0.00	0.00
508/ 91/ SLS-	432.28	0.0	0.0
508/ 142/ SLS-	422.56	-0.00	0.00
517/ 11/ SLS-	419.93	0.00	-0.00
506/ 89/ SLS-	376.94	0.0	0.0
506/ 140/ SLS-	367.23	0.00	0.00

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
507/ 90/ SLS-	353.96	0.0	0.0
522/ 71/ SLS-	347.45	0.0	0.0
507/ 141/ SLS-	344.24	0.00	0.00
522/ 122/ SLS-	337.74	-0.00	-0.00
505/ 88/ SLS-	292.11	0.0	0.0
505/ 139/ SLS-	282.39	-0.00	-0.00
513/ 6/ SLS-	241.05	0.0	0.0
513/ 14/ SLS-	230.88	0.00	0.00
525/ 83/ SLS-	79.51	0.0	0.0
525/ 134/ SLS-	69.79	-0.00	-0.00

Column 511 - Calculation Report

1 Level:

- Name :
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.08
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column511 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1 C
Diameter = 400 (mm)
2.2.2 Height: L = 3.30 (m)
2.2.3 Slab thickness = 0.11 (m)
2.2.4 Beam height = 0.25 (m)
2.2.5 Cover = 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005
- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

Unsatisfactory load capacity of the column.
The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 0.89 < 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012 (A)
Combination type: ULS
Internal forces:
Nsd = 1718.11 (kN) Msdy = 0.00 (kN*m) Msdz = 0.00 (kN*m)
Design forces:
Upper node
N = 1718.11 (kN) N*etotz = 34.36 (kN*m) N*etoty= 34.36 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	0 (mm)	0 (mm)
Imperfection	ei:	8 (mm)	8 (mm)
I order (e0 + ei)	e0Ed:	8 (mm)	8 (mm)
II order	e2:	0 (mm)	0 (mm)
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	20 (mm)	20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)

Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M0 = 0.00 (kN*m)
ea = θ1*lo/2 = 8 (mm)
θ1 = θo * αη * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 14.17 (kN*m)
MEdmin = 34.36 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 34.36 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M0 = 0.00 (kN*m)
ea = θ1*lo/2 = 8 (mm)
θ1 = θo * αh * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 14.17 (kN*m)
MEdmin = 34.36 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 34.36 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 1539 (mm2)
Ratio:	ρ = 1.23 %

2.5 Reinforcement:

Main bars (HA 320):

- 10 ϕ14 l = 3.27 (m)

Transversal reinforcement: (HA 320):

stirrups: 17 ϕ8 l = 1.26 (m)

3 Material survey:

- Concrete volume = 0.38 (m3)
- Formwork = 3.83 (m2)

- Steel HA 320
  - Total weight = 47.93 (kG)
  - Density = 125.06 (kG/m3)
  - Average diameter = 11.6 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	21.44	8.46
14	32.65	39.47

Column521 - Calculation Report

1 Level:

- Name :
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.08
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column521 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1 C
Diameter = 400 (mm)
2.2.2 Height: L = 3.30 (m)
2.2.3 Slab thickness = 0.11 (m)
2.2.4 Beam height = 0.25 (m)
2.2.5 Cover = 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005
- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 2.08 > 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012 (B)
Combination type: ULS
Internal forces:
Nsd = 734.80 (kN) Msdy = 0.00 (kN*m) Msdz = 0.00 (kN*m)
Design forces:
Lower node
N = 734.80 (kN) N*etotz = 14.70 (kN*m) N*etoty= 14.70 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	0 (mm)	0 (mm)
Imperfection	ei:	8 (mm)	8 (mm)
I order (e0 + ei)	e0Ed:	8 (mm)	8 (mm)
II order	e2:	0 (mm)	0 (mm)
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	20 (mm)	20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account

M0 = 0.00 (kN*m)
ea = θ1*lo/2 = 8 (mm)
θ1 = θo * αη * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 6.06 (kN*m)
MEdmin = 14.70 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 14.70 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M0 = 0.00 (kN*m)
ea = θ1*lo/2 = 8 (mm)
θ1 = θo * αh * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 6.06 (kN*m)
MEdmin = 14.70 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 14.70 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 1539 (mm2)
Ratio:	ρ = 1.23 %

2.5 Reinforcement:

Main bars (HA 320):

- 10 ϕ14 l = 3.27 (m)

Transversal reinforcement: (HA 320):

stirrups: 17 ϕ8 l = 1.26 (m)

3 Material survey:

- Concrete volume = 0.38 (m3)
- Formwork = 3.83 (m2)

- Steel HA 320
  - Total weight = 47.93 (kG)
  - Density = 125.06 (kG/m3)
  - Average diameter = 11.6 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	21.44	8.46
14	32.65	39.47

Column 525 - Calculation Report

1 Level:

- Name :
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.13
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column525 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1	Rectangular	200 x 600 (mm)
2.2.2	Height: L	= 3.30 (m)
2.2.3	Slab thickness	= 0.11 (m)
2.2.4	Beam height	= 0.25 (m)
2.2.5	Cover	= 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005

- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 11.96 > 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012 (C)
Combination type: ULS
Internal forces:
Nsd = 112.54 (kN) Msdy = 0.00 (kN*m) Msdz = 0.00 (kN*m)
Design forces:
Cross-section in the middle of the column
N = 112.54 (kN) N*etotz = 2.25 (kN*m) N*etoty= 2.25 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	0 (mm)	0 (mm)
Imperfection	ei:	8 (mm)	8 (mm)
I order (e0 + ei)	e0Ed:	8 (mm)	8 (mm)
II order	e2:	0 (mm)	0 (mm)
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	20 (mm)	20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m) MC = 0.00 (kN*m)
Case: Cross-section in the middle of the column, Slenderness not taken into account
M02 = max(|MA| ; |MB|)

M01 = min(|MA| ; |MB|)
M0e = 0.6*M02+0.4*M01 = 0.00 (kN*m)
M0emin = 0.4*M02
M0 = max(M0e, M0emin)

ea = $\theta 1$*lo/2 = 8 (mm)
$\theta 1 = \theta o * \alpha \eta * \alpha m = 0.01$
$\theta o = 0.01$
$\alpha h = 1.00$
$\alpha m = (0,5(1+1/m))^{0.5} = 1.00$
m = 1.00
Ma = N*ea = 0.93 (kN*m)
MEdmin = 2.25 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 2.25 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m) MC = 0.00 (kN*m)
Case: Cross-section in the middle of the column, Slenderness not taken into account
M02 = max(|MA| ; |MB|)
M01 = min(|MA| ; |MB|)
M0e = 0.6*M02+0.4*M01 = 0.00 (kN*m)
M0emin = 0.4*M02
M0 = max(M0e, M0emin)

ea = $\theta 1$*lo/2 = 8 (mm)
$\theta 1 = \theta o * \alpha h * \alpha m = 0.01$
$\theta o = 0.01$
$\alpha h = 1.00$
$\alpha m = (0,5(1+1/m))^{0.5} = 1.00$
m = 1.00
Ma = N*ea = 0.93 (kN*m)
MEdmin = 2.25 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 2.25 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 1539 (mm2)
Ratio:	ρ = 1.28 %

2.5 Reinforcement:

Main bars (HA 320):

- 10 ϕ14 l = 3.27 (m)

Transversal reinforcement: (HA 320):

stirrups:	21 ϕ8	l = 1.48 (m)
pins	63 ϕ8	l = 0.38 (m)

3 Material survey:

- Concrete volume = 0.37 (m3)
- Formwork = 4.88 (m2)

- Steel HA 320
  - Total weight = 61.24 (kG)
  - Density = 167.31 (kG/m3)
  - Average diameter= 10.2 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	55.15	21.77
14	32.65	39.47

Column 510 - Calculation Report

1 Level:

- Name :
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.08
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column510 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1 C
Diameter = 400 (mm)
2.2.2 Height: L = 3.30 (m)
2.2.3 Slab thickness = 0.11 (m)
2.2.4 Beam height = 0.25 (m)
2.2.5 Cover = 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005
- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

Unsatisfactory load capacity of the column.
The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 0.88 < 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012 (A)
Combination type: ULS
Internal forces:
Nsd = 1723.59 (kN) Msdy = 0.00 (kN*m) Msdz = 0.00 (kN*m)
Design forces:
Upper node
N = 1723.59 (kN) N*etotz = 34.47 (kN*m) N*etoty= 34.47 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	0 (mm)	0 (mm)
Imperfection	ei:	8 (mm)	8 (mm)
I order (e0 + ei)	e0Ed:	8 (mm)	8 (mm)
II order	e2:	0 (mm)	0 (mm)
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	20 (mm)	20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)

Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M0 = 0.00 (kN*m)
ea = θ1*lo/2 = 8 (mm)
θ1 = θo * αη * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 14.22 (kN*m)
MEdmin = 34.47 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 34.47 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M0 = 0.00 (kN*m)
ea = θ1*lo/2 = 8 (mm)
θ1 = θo * αh * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 14.22 (kN*m)
MEdmin = 34.47 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 34.47 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 1539 (mm2)
Ratio:	ρ = 1.23 %

2.5 Reinforcement:

Main bars (HA 320):

- 10 ϕ14 l = 3.27 (m)

Transversal reinforcement: (HA 320):

stirrups: 17 ϕ8 l = 1.26 (m)

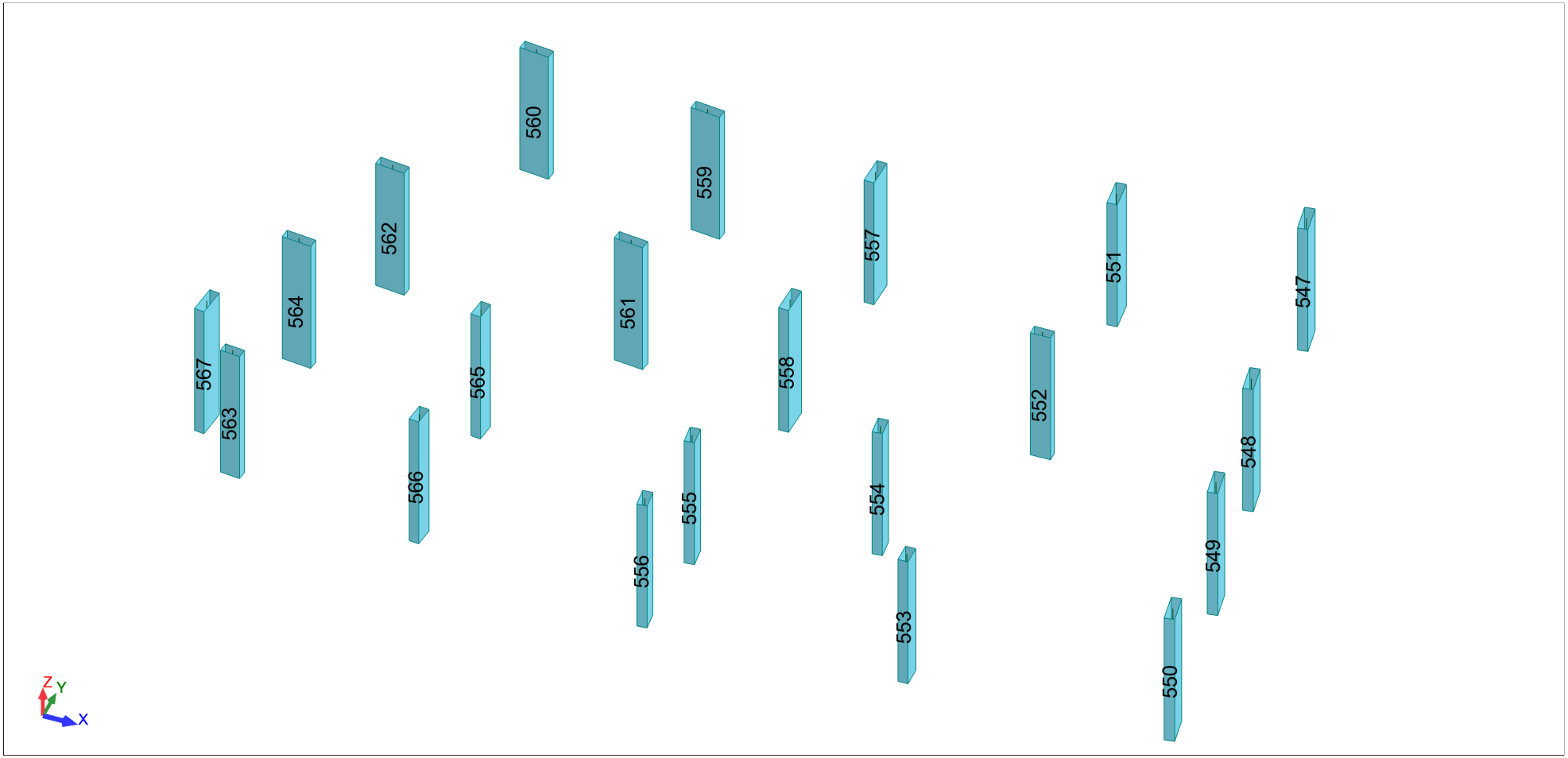
3 Material survey:

- Concrete volume = 0.38 (m3)
- Formwork = 3.83 (m2)

- Steel HA 320
  - Total weight = 47.93 (kG)
  - Density = 125.06 (kG/m3)
  - Average diameter = 11.6 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)	Number (No.)	Total weight (kG)
8	1.26	0.50	17	8.46
14	3.27	3.95	10	39.47

Columns - Third Floor Level



Columns - Third Floor Level - +ULS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
553/ 208/ ULS+	789.29	0.0	0.0
553/ 222/ ULS+	781.34	0.00	0.00
552/ 209/ ULS+	758.01	0.0	0.0
552/ 220/ ULS+	750.06	-0.00	0.00
554/ 204/ ULS+	574.14	0.0	0.0
554/ 223/ ULS+	566.19	-0.00	0.00
551/ 25/ ULS+	542.76	0.0	0.0
551/ 27/ ULS+	530.84	0.00	0.00
566/ 175/ ULS+	465.34	0.0	0.0
566/ 237/ ULS+	457.39	0.00	0.00
556/ 195/ ULS+	443.38	0.0	0.0
556/ 226/ ULS+	435.43	0.00	-0.00
565/ 172/ ULS+	426.38	0.0	0.0
557/ 24/ ULS+	425.30	0.0	0.0
565/ 235/ ULS+	418.43	0.00	0.00
560/ 20/ ULS+	415.84	0.0	0.0
560/ 258/ ULS+	403.92	0.00	0.00
559/ 19/ ULS+	394.81	0.0	0.0
558/ 23/ ULS+	389.14	0.0	0.0
558/ 29/ ULS+	377.22	0.00	0.00
562/ 168/ ULS+	368.75	0.0	0.0
562/ 31/ ULS+	356.83	-0.00	0.00
561/ 161/ ULS+	356.42	0.0	0.0
557/ 30/ ULS+	356.20	0.00	0.00
559/ 251/ ULS+	345.80	0.00	-0.00
561/ 249/ ULS+	344.50	0.0	-0.00
550/ 193/ ULS+	325.30	0.0	0.0
550/ 212/ ULS+	313.38	0.00	0.00
548/ 191/ ULS+	282.99	0.0	0.0
548/ 214/ ULS+	271.07	0.00	0.00
564/ 173/ ULS+	269.34	0.0	0.0
549/ 192/ ULS+	263.96	0.0	0.0

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
563/ 176/ ULS+	260.44	0.0	0.0
564/ 240/ ULS+	257.42	-0.00	0.00
563/ 262/ ULS+	252.49	0.00	0.00
549/ 213/ ULS+	252.04	0.00	0.0
547/ 190/ ULS+	214.36	0.0	0.0
555/ 22/ ULS+	204.47	0.0	0.0
547/ 215/ ULS+	202.44	0.00	0.00
555/ 227/ ULS+	196.53	0.00	0.00
567/ 185/ ULS+	86.42	0.0	0.0
567/ 244/ ULS+	74.50	0.00	-0.00

Columns - Third Floor Level - -ULS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
553/ 208/ ULS-	250.08	0.0	0.0
553/ 222/ ULS-	244.20	0.00	0.00
552/ 209/ ULS-	192.14	0.0	0.0
552/ 220/ ULS-	186.25	-0.00	-0.00
551/ 25/ ULS-	168.12	0.0	0.0
554/ 204/ ULS-	161.17	0.0	0.0
551/ 27/ ULS-	159.29	-0.00	0.00
556/ 195/ ULS-	155.78	0.0	0.0
554/ 223/ ULS-	155.28	-0.00	0.00
557/ 24/ ULS-	152.43	0.0	0.0
556/ 226/ ULS-	149.89	-0.00	-0.00
566/ 175/ ULS-	143.72	0.0	0.0
560/ 20/ ULS-	143.18	0.0	0.0
559/ 19/ ULS-	139.01	0.0	0.0
566/ 237/ ULS-	137.83	0.0	0.0
560/ 258/ ULS-	134.35	0.00	-0.00
558/ 23/ ULS-	132.05	0.0	0.0
557/ 30/ ULS-	126.74	0.00	-0.00
558/ 29/ ULS-	123.21	-0.00	0.0
562/ 168/ ULS-	121.34	0.0	0.0
559/ 251/ ULS-	119.22	-0.00	-0.00
565/ 172/ ULS-	119.15	0.0	0.0
561/ 161/ ULS-	117.58	0.0	0.0
550/ 193/ ULS-	114.61	0.0	0.0
565/ 235/ ULS-	113.26	-0.00	-0.00
562/ 31/ ULS-	112.51	-0.00	-0.00
561/ 249/ ULS-	108.75	-0.00	-0.00
550/ 212/ ULS-	105.78	0.00	-0.00
564/ 173/ ULS-	90.38	0.0	0.0
548/ 191/ ULS-	88.40	0.0	0.0
549/ 192/ ULS-	82.94	0.0	0.0
564/ 240/ ULS-	81.55	-0.00	0.00

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
563/ 176/ ULS-	80.35	0.0	0.0
547/ 190/ ULS-	79.58	0.0	0.0
548/ 214/ ULS-	79.57	-0.00	-0.00
563/ 262/ ULS-	74.46	0.0	-0.00
549/ 213/ ULS-	74.11	0.0	-0.00
547/ 215/ ULS-	70.75	0.00	0.00
555/ 22/ ULS-	64.24	0.0	0.0
555/ 227/ ULS-	58.36	0.00	0.0
567/ 185/ ULS-	43.87	0.0	0.0
567/ 244/ ULS-	35.04	0.00	-0.00

Columns - Third Floor Level - +SLS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
553/ 208/ SLS+	517.64	0.0	0.0
553/ 222/ SLS+	511.75	0.00	0.00
552/ 209/ SLS+	489.72	0.0	0.0
552/ 220/ SLS+	483.83	-0.00	0.00
554/ 204/ SLS+	372.79	0.0	0.0
554/ 223/ SLS+	366.90	-0.00	0.00
551/ 25/ SLS+	356.57	0.0	0.0
551/ 27/ SLS+	347.74	0.00	0.00
566/ 175/ SLS+	306.07	0.0	0.0
566/ 237/ SLS+	300.18	0.00	0.00
556/ 195/ SLS+	293.95	0.0	0.0
556/ 226/ SLS+	288.07	-0.00	-0.00
565/ 172/ SLS+	278.21	0.0	0.0
560/ 20/ SLS+	275.70	0.0	0.0
565/ 235/ SLS+	272.32	0.00	-0.00
557/ 24/ SLS+	268.99	0.0	0.0
560/ 258/ SLS+	266.86	0.00	-0.00
559/ 19/ SLS+	251.92	0.0	0.0
558/ 23/ SLS+	249.21	0.0	0.0
562/ 168/ SLS+	244.65	0.0	0.0
558/ 29/ SLS+	240.38	0.00	0.00
562/ 31/ SLS+	235.82	-0.00	0.00
557/ 30/ SLS+	229.79	0.00	-0.00
561/ 161/ SLS+	229.33	0.0	0.0
559/ 251/ SLS+	224.07	-0.00	-0.00
561/ 249/ SLS+	220.50	-0.00	-0.00
550/ 193/ SLS+	216.47	0.0	0.0
550/ 212/ SLS+	207.64	0.00	0.00
548/ 191/ SLS+	186.16	0.0	0.0
564/ 173/ SLS+	178.63	0.0	0.0
548/ 214/ SLS+	177.33	-0.00	0.00
549/ 192/ SLS+	173.77	0.0	0.0

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
563/ 176/ SLS+	170.29	0.0	0.0
564/ 240/ SLS+	169.80	-0.00	0.00
549/ 213/ SLS+	164.94	0.00	-0.00
563/ 262/ SLS+	164.40	0.00	0.00
547/ 190/ SLS+	143.57	0.0	0.0
555/ 22/ SLS+	136.20	0.0	0.0
547/ 215/ SLS+	134.74	0.00	0.00
555/ 227/ SLS+	130.32	0.00	0.00
567/ 185/ SLS+	60.04	0.0	0.0
567/ 244/ SLS+	51.21	0.00	-0.00

Columns - Third Floor Level - -SLS

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
553/ 208/ SLS-	492.85	0.0	0.0
553/ 222/ SLS-	486.96	0.00	0.00
552/ 209/ SLS-	463.17	0.0	0.0
552/ 220/ SLS-	457.28	-0.00	0.00
554/ 204/ SLS-	353.37	0.0	0.0
554/ 223/ SLS-	347.48	-0.00	0.00
551/ 25/ SLS-	339.75	0.0	0.0
551/ 27/ SLS-	330.92	0.00	0.00
566/ 175/ SLS-	291.78	0.0	0.0
566/ 237/ SLS-	285.89	0.00	0.00
556/ 195/ SLS-	281.20	0.0	0.0
556/ 226/ SLS-	275.31	-0.00	-0.00
565/ 172/ SLS-	264.29	0.0	0.0
560/ 20/ SLS-	263.74	0.0	0.0
565/ 235/ SLS-	258.40	-0.00	-0.00
560/ 258/ SLS-	254.91	0.00	-0.00
557/ 24/ SLS-	251.96	0.0	0.0
559/ 19/ SLS-	236.93	0.0	0.0
558/ 23/ SLS-	234.76	0.0	0.0
562/ 168/ SLS-	234.10	0.0	0.0
558/ 29/ SLS-	225.93	-0.00	0.00
562/ 31/ SLS-	225.27	-0.00	0.00
557/ 30/ SLS-	217.19	0.00	-0.00
561/ 161/ SLS-	216.50	0.0	0.0
559/ 251/ SLS-	212.21	-0.00	-0.00
561/ 249/ SLS-	207.67	-0.00	-0.00
550/ 193/ SLS-	207.41	0.0	0.0
550/ 212/ SLS-	198.58	0.00	0.00
548/ 191/ SLS-	177.49	0.0	0.0
564/ 173/ SLS-	170.91	0.0	0.0
548/ 214/ SLS-	168.66	-0.00	0.00
549/ 192/ SLS-	165.72	0.0	0.0

Bar/Node/Case	FX (kN)	MY (kNm)	MZ (kNm)
564/ 240/ SLS-	162.07	-0.00	0.00
563/ 176/ SLS-	161.92	0.0	0.0
549/ 213/ SLS-	156.89	0.00	-0.00
563/ 262/ SLS-	156.03	0.00	0.00
547/ 190/ SLS-	137.94	0.0	0.0
555/ 22/ SLS-	130.56	0.0	0.0
547/ 215/ SLS-	129.11	0.00	0.00
555/ 227/ SLS-	124.67	0.00	0.00
567/ 185/ SLS-	58.57	0.0	0.0
567/ 244/ SLS-	49.74	0.00	-0.00

Column 553 - Calculation Report

1 Level:

- Name :
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.16
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column553 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1	Rectangular	200 x 400 (mm)
2.2.2	Height: L	= 3.00 (m)
2.2.3	Slab thickness	= 0.10 (m)
2.2.4	Beam height	= 0.25 (m)
2.2.5	Cover	= 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005

- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 1.09 > 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012 (B)
Combination type: ULS
Internal forces:
Nsd = 789.29 (kN) Msdy = 0.00 (kN*m) Msdz = 0.00 (kN*m)
Design forces:
Lower node
N = 789.29 (kN) N*etotz = 15.79 (kN*m) N*etoty= 15.79 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	0 (mm)	0 (mm)
Imperfection	ei:	8 (mm)	8 (mm)
I order (e0 + ei)	e0Ed:	8 (mm)	8 (mm)
II order	e2:	0 (mm)	0 (mm)
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	20 (mm)	20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M0 = 0.00 (kN*m)

ea = $\theta 1$*lo/2 = 8 (mm)
$\theta 1 = \theta o * \alpha \eta * \alpha m = 0.01$
$\theta o = 0.01$
$\alpha h = 1.00$
$\alpha m = (0,5(1+1/m))^{0.5} = 1.00$
m = 1.00
Ma = N*ea = 5.92 (kN*m)
MEdmin = 15.79 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 15.79 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M0 = 0.00 (kN*m)
ea = $\theta 1$*lo/2 = 8 (mm)
$\theta 1 = \theta o * \alpha h * \alpha m = 0.01$
$\theta o = 0.01$
$\alpha h = 1.00$
$\alpha m = (0,5(1+1/m))^{0.5} = 1.00$
m = 1.00
Ma = N*ea = 5.92 (kN*m)
MEdmin = 15.79 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 15.79 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 924 (mm2)
Ratio:	ρ = 1.15 %

2.5 Reinforcement:

Main bars (HA 320):

- 6 ϕ14 l = 2.97 (m)

Transversal reinforcement: (HA 320):

stirrups: 18 ϕ8 l = 1.08 (m)

pins 18 ϕ8 l = 0.38 (m)

3 Material survey:

- Concrete volume = 0.22 (m3)
- Formwork = 3.30 (m2)

- Steel HA 320
  - Total weight = 31.87 (kG)
  - Density = 144.86 (kG/m3)
  - Average diameter = 10.4 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	26.26	10.36
14	17.79	21.51

Column 563 - Calculation Report

1 Level:

- Name :
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.16
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column563 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1	Rectangular	400 x 200 (mm)
2.2.2	Height: L	= 3.00 (m)
2.2.3	Slab thickness	= 0.11 (m)
2.2.4	Beam height	= 0.25 (m)
2.2.5	Cover	= 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005

- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 3.29 > 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012 (A)
Combination type: ULS
Internal forces:
Nsd = 260.44 (kN) Msdy = 0.00 (kN*m) Msdz = 0.00 (kN*m)
Design forces:
Upper node
N = 260.44 (kN) N*etotz = 5.21 (kN*m) N*etoty= 5.21 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	0 (mm)	0 (mm)
Imperfection	ei:	8 (mm)	8 (mm)
I order (e0 + ei)	e0Ed:	8 (mm)	8 (mm)
II order	e2:	0 (mm)	0 (mm)
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	20 (mm)	20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M0 = 0.00 (kN*m)

ea = θ1*lo/2 = 8 (mm)
θ1 = θo * αη * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 1.95 (kN*m)
MEdmin = 5.21 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 5.21 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M0 = 0.00 (kN*m)
ea = θ1*lo/2 = 8 (mm)
θ1 = θo * αh * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 1.95 (kN*m)
MEdmin = 5.21 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 5.21 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 924 (mm2)
Ratio:	ρ = 1.15 %

2.5 Reinforcement:

Main bars (HA 320):

- 6 ϕ14 l = 2.97 (m)

Transversal reinforcement: (HA 320):

stirrups: 18 ϕ8 l = 1.08 (m)

pins	18 ϕ8	l = 0.38 (m)

3 Material survey:

- Concrete volume = 0.22 (m3)
- Formwork = 3.30 (m2)

- Steel HA 320
  - Total weight = 31.87 (kG)
  - Density = 144.86 (kG/m3)
  - Average diameter = 10.4 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	26.26	10.36
14	17.79	21.51

Column 567 - Calculation Report

1 Level:

- Name :
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.13
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column567 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1 Rectangular 200 x 600 (mm)
2.2.2 Height: L = 3.00 (m)
2.2.3 Slab thickness = 0.11 (m)
2.2.4 Beam height = 0.25 (m)
2.2.5 Cover = 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005

- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 15.57 > 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012 (B)
Combination type: ULS
Internal forces:
Nsd = 86.42 (kN) Msdy = 0.00 (kN*m) Msdz = 0.00 (kN*m)
Design forces:
Lower node
N = 86.42 (kN) N*etotz = 1.73 (kN*m) N*etoty= 1.73 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	0 (mm)	0 (mm)
Imperfection	ei:	8 (mm)	8 (mm)
I order (e0 + ei)	e0Ed:	8 (mm)	8 (mm)
II order	e2:	0 (mm)	0 (mm)
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	20 (mm)	20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M0 = 0.00 (kN*m)

ea = $\theta 1$*lo/2 = 8 (mm)
$\theta 1 = \theta o * \alpha \eta * \alpha m = 0.01$
$\theta o = 0.01$
$\alpha h = 1.00$
$\alpha m = (0,5(1+1/m))^{0.5} = 1.00$
m = 1.00
Ma = N*ea = 0.65 (kN*m)
MEdmin = 1.73 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 1.73 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M0 = 0.00 (kN*m)
ea = $\theta 1$*lo/2 = 8 (mm)
$\theta 1 = \theta o * \alpha h * \alpha m = 0.01$
$\theta o = 0.01$
$\alpha h = 1.00$
$\alpha m = (0,5(1+1/m))^{0.5} = 1.00$
m = 1.00
Ma = N*ea = 0.65 (kN*m)
MEdmin = 1.73 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 1.73 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 1539 (mm2)
Ratio:	ρ = 1.28 %

2.5 Reinforcement:

Main bars (HA 320):

- 10 ϕ14 l = 2.97 (m)

Transversal reinforcement: (HA 320):

stirrups: 19 ϕ8 l = 1.48 (m)

pins	57 ϕ8	l = 0.38 (m)

3 Material survey:

- Concrete volume = 0.33 (m3)
- Formwork = 4.40 (m2)

- Steel HA 320
  - Total weight = 55.54 (kG)
  - Density = 168.29 (kG/m3)
  - Average diameter = 10.2 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	49.90	19.70
14	29.65	35.84

Column 552 - Claculation Report

1 Level:

- Name :
- Reference level : 0.00 (m)
- Concrete creep coefficient : φ_p = 2.16
- Cement class : N
- Environment class : XC1
- Structure class : S4

2 Column: Column552 Number of identical elements: 1

2.1 Material properties:

- Concrete : C20/25 (02) f_{ck} = 20.00 (MPa)
  Unit weight : 2501.36 (kG/m3)
  Aggregate size : 20.0 (mm)
- Longitudinal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)
  Ductility class : B
- Transversal reinforcement: : HA 320 f_{yk} = 320.00 (MPa)

2.2 Geometry:

2.2.1	Rectangular	400 x 200 (mm)
2.2.2	Height: L	= 3.00 (m)
2.2.3	Slab thickness	= 0.11 (m)
2.2.4	Beam height	= 0.25 (m)
2.2.5	Cover	= 35 (mm)

2.3 Calculation options:

- Calculations according to : BS EN1992-1-1:2004 NA:2005

- Seismic dispositions : No requirements
- Precast column : no
- Pre-design : no
- Slenderness taken into account : no
- Compression : with bending
- Ties : to slab
- Fire resistance class : No requirements

2.4 Calculation results:

The reinforcing steel strength exceeds the range of values allowed by the code - 3.2.2 (3)

Safety factors Rd/Ed = 1.13 > 1.0

2.4.1 ULS/ALS Analysis

Design combination: 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012 (A)
Combination type: ULS
Internal forces:
Nsd = 758.01 (kN) Msdy = 0.00 (kN*m) Msdz = 0.00 (kN*m)
Design forces:
Upper node
N = 758.01 (kN) N*etotz = 15.16 (kN*m) N*etoty= 15.16 (kN*m)

Eccentricity:		ez (My/N)	ey (Mz/N)
Initial	e0:	0 (mm)	0 (mm)
Imperfection	ei:	8 (mm)	8 (mm)
I order (e0 + ei)	e0Ed:	8 (mm)	8 (mm)
II order	e2:	0 (mm)	0 (mm)
Minimal	eEdmin:	20 (mm)	20 (mm)
Total	eEd:	20 (mm)	20 (mm)

2.4.1.1. Detailed analysis-Direction Y:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M0 = 0.00 (kN*m)

ea = θ1*lo/2 = 8 (mm)
θ1 = θo * αη * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 5.69 (kN*m)
MEdmin = 15.16 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 15.16 (kN*m)

2.4.1.2. Detailed analysis-Direction Z:

MA = 0.00 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M0 = 0.00 (kN*m)
ea = θ1*lo/2 = 8 (mm)
θ1 = θo * αh * αm = 0.01
θo = 0.01
αh = 1.00
αm = (0,5(1+1/m))^0.5 = 1.00
m = 1.00
Ma = N*ea = 5.69 (kN*m)
MEdmin = 15.16 (kN*m)
M0Ed = max(MEdmin,M0 + Ma) = 15.16 (kN*m)

2.4.2 Reinforcement:

Real (provided) area	Asr = 924 (mm2)
Ratio:	ρ = 1.15 %

2.5 Reinforcement:

Main bars (HA 320):

- 6 ϕ14 l = 2.97 (m)

Transversal reinforcement: (HA 320):

stirrups: 18 ϕ8 l = 1.08 (m)

pins	18 ϕ8	l = 0.38 (m)

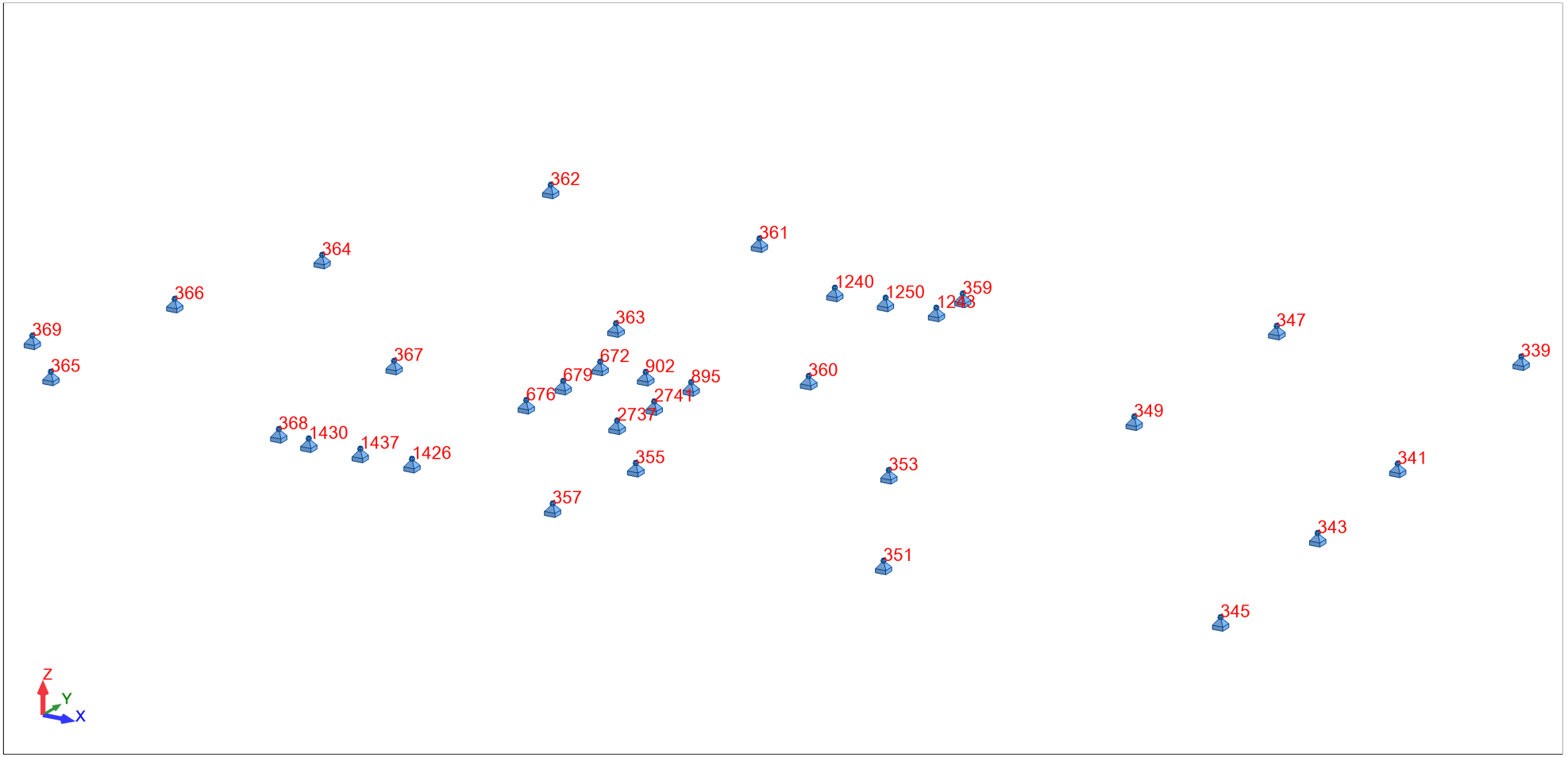
3 Material survey:

- Concrete volume = 0.22 (m3)
- Formwork = 3.30 (m2)

- Steel HA 320
  - Total weight = 31.87 (kG)
  - Density = 144.86 (kG/m3)
  - Average diameter = 10.4 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
8	26.26	10.36
14	17.79	21.51

Foundation Level



Foundation Level - Reaction - +ULS

in the coordinate system: global -

Node/Case	FX (kN)	FY (kN)	FZ (kN)
351/ ULS+	24.81	5.16	2295.13
349/ ULS+	5.53	0.03	2250.08
347/ ULS+	-0.43	-0.66	1579.26
368/ ULS+	11.77	0.35	1515.13
363/ ULS+	-5.94	15.20	1506.60
353/ ULS+	13.72	1.45	1505.64
357/ ULS+	2.91	6.97	1368.45
364/ ULS+	14.00	4.10	1340.77
367/ ULS+	-2.01	-0.03	1321.07
362/ ULS+	1.59	-3.89	1242.11
360/ ULS+	2.62	11.75	1157.96
359/ ULS+	7.79	38.13	1102.79
365/ ULS+	6.35	-1.25	1084.86
361/ ULS+	-2.48	-3.09	1060.15
345/ ULS+	-5.75	16.03	942.45
341/ ULS+	-4.42	32.51	846.35
366/ ULS+	2.41	-2.23	827.78
343/ ULS+	-9.58	-3.07	796.99
339/ ULS+	-1.55	-5.07	649.62
355/ ULS+	1.47	26.32	536.07
369/ ULS+	7.20	4.26	130.82

Foundation Level - Reaction - -ULS

in the coordinate system: global -

Node/Case	FX (kN)	FY (kN)	FZ (kN)
351/ ULS-	3.91	2.74	627.69
349/ ULS-	2.40	-2.03	557.96
363/ ULS-	-20.27	3.31	467.77
347/ ULS-	-1.53	-3.77	459.41
368/ ULS-	0.84	-0.80	421.69
362/ ULS-	0.17	-16.18	413.89
364/ ULS-	4.97	-0.76	403.73
357/ ULS-	0.67	1.08	403.72
353/ ULS-	9.79	0.78	389.33
359/ ULS-	0.81	9.33	370.47
360/ ULS-	1.20	5.03	359.55
361/ ULS-	-3.71	-14.24	354.96
367/ ULS-	-2.56	-1.63	345.96
365/ ULS-	2.42	-3.82	326.00
345/ ULS-	-38.77	2.14	291.69
366/ ULS-	1.36	-5.45	257.87
341/ ULS-	-12.07	4.40	236.86
343/ ULS-	-11.61	-16.32	228.55
339/ ULS-	-8.68	-36.53	211.23
355/ ULS-	0.35	6.01	152.36
369/ ULS-	1.88	0.93	97.30

Foundation Level - Reaction - +SLS

in the coordinate system: global -

Node/Case	FX (kN)	FY (kN)	FZ (kN)
351/ SLS+	18.20	3.83	1503.16
349/ SLS+	3.98	0.02	1451.45
347/ SLS+	-0.91	-2.77	1040.16
368/ SLS+	8.47	0.26	996.57
353/ SLS+	9.90	1.00	975.24
363/ SLS+	-14.61	11.26	941.50
357/ SLS+	1.94	4.75	908.11
364/ SLS+	10.37	3.04	880.33
367/ SLS+	-1.81	-0.68	851.25
362/ SLS+	1.18	-11.58	822.77
360/ SLS+	1.94	5.95	737.32
365/ SLS+	4.27	-2.00	709.55
359/ SLS+	5.77	25.54	701.45
361/ SLS+	-1.96	-10.52	677.33
345/ SLS+	-28.61	11.87	628.53
341/ SLS+	-8.56	24.08	560.49
366/ SLS+	1.46	-3.25	543.47
343/ SLS+	-8.35	-11.99	528.02
339/ SLS+	-6.12	-26.99	437.78
355/ SLS+	1.05	18.08	360.95
369/ SLS+	4.77	3.11	96.90

Foundation Level - Reaction - -SLS

in the coordinate system: global -

Node/Case	FX (kN)	FY (kN)	FZ (kN)
351/ SLS-	18.13	3.79	1430.32
349/ SLS-	3.94	-0.00	1371.83
347/ SLS-	-0.97	-2.77	992.20
368/ SLS-	8.38	0.16	950.06
353/ SLS-	9.81	0.98	923.44
363/ SLS-	-14.72	11.23	876.96
357/ SLS-	1.86	4.60	869.06
364/ SLS-	10.33	2.83	838.60
367/ SLS-	-1.90	-0.82	804.16
362/ SLS-	1.10	-11.69	786.77
360/ SLS-	1.92	4.93	692.77
365/ SLS-	4.11	-2.22	674.76
359/ SLS-	5.76	24.53	658.76
361/ SLS-	-2.17	-10.53	637.40
345/ SLS-	-28.64	11.87	602.79
341/ SLS-	-8.66	24.05	535.92
366/ SLS-	1.34	-3.46	517.70
343/ SLS-	-8.42	-12.02	504.96
339/ SLS-	-6.21	-27.01	421.72
355/ SLS-	1.03	17.56	347.58
369/ SLS-	4.57	3.10	96.82

Foundation 365 - Calculation Report

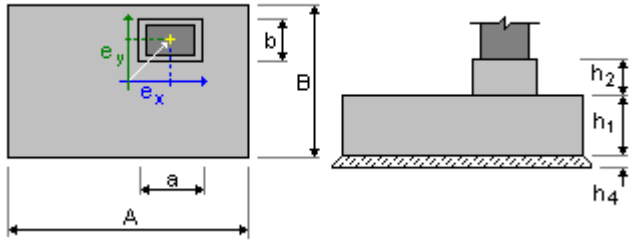
1 Spread footing: Foundation365 Number of identical elements: 1

1.1 Basic data

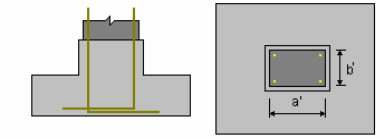
1.1.1 Assumptions

- Geotechnic calculations according to : BS 8004
- Concrete calculations according to : BS EN1992-1-1:2004 NA:2005
- Shape selection : without limits

1.1.2 Geometry:



A	= 1.50 (m)	a	= 0.20 (m)
B	= 1.50 (m)	b	= 0.60 (m)
h1	= 0.50 (m)	e_x	= 0.00 (m)
h2	= 0.00 (m)	e_y	= 0.00 (m)
h4	= 0.10 (m)		



a' = 200 (mm)

b' = 600 (mm)
$c_{nom}1$ = 60 (mm)
$c_{nom}2$ = 60 (mm)
Cover deviations: Cdev = 10(mm), Cdur = 0(mm)

1.1.3 Materials

- Concrete : C20/25 (02); Characteristic strength = 20.00 MPa
  Unit weight = 2501.36 (kG/m3)
  Rectangular stress distribution [3.1.7(3)]
- Longitudinal reinforcement : type HA 320 Characteristic strength = 320.00 MPa
  Ductility class: -
  Horizontal branch of the stress-strain diagram
- Transversal reinforcement : type HA 500 Characteristic strength = 500.00 MPa
- Additional reinforcement: : type Characteristic strength = 460.00 MPa

1.1.4 Loads:

Foundation loads:

Case	Nature	Group	N (kN)	Fx (kN)	Fy (kN)	Mx (kN*m)	My (kN*m)
1	dead load(Structural)	365	326.00	-2.42	1.25	0.00	0.00
2	dead load(Non-structural)	365	15.95	-0.08	0.11	0.00	-0.00
3	dead load(Non-structural)	365	83.83	-0.35	0.40	0.00	-0.00
4	dead load(Non-structural)	365	12.13	-0.06	0.06	0.00	-0.00
5	dead load(Non-structural)	365	53.69	-0.17	0.16	0.00	-0.00
6	dead load(Non-structural)	365	4.55	-0.02	0.03	0.00	-0.00
7	dead load(Non-structural)	365	15.05	-0.08	0.00	0.00	0.00
8	dead load(Non-structural)	365	150.30	-0.54	0.47	0.00	0.00
10	live load(Category A)	365	6.84	-0.04	0.05	-0.00	-0.00
11	live load(Category A)	365	-1.02	-0.15	0.51	-0.00	-0.00
12	live load(Category A)	365	110.13	-0.35	0.19	0.00	0.00
9	dead load(Non-structural)	365	13.24	-0.39	-0.48	-0.00	0.00

Backfill loads:

Case	Nature	Q1 (kN/m2)

1.1.5 Combination list

1/	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012
2/	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009
3/	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+0.8010+0.8011+0.8012
4/*	ULS : 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012
5/*	ULS : 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359
6/*	ULS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.5010+1.5011+1.5012
7/*	ULS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009
8/*	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012
9/*	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009
10/*	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+0.5010+0.5011+0.5012
11/*	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+0.3010+0.3011+0.3012

1.2 Geotechnical design

1.2.1 Assumptions

Foundation design for:
- Capacity
- Rotation
- Sliding
- Sliding with soil pressure considered: none
- Uplift
- Average settlement

1.2.2 Soil:

Soil level:	N_1	= 0.00 (m)
Column pier level:	N_a	= 0.00 (m)
Minimum reference level:	N_f	= -0.50 (m)

very fine sands
- Soil level: 0.00 (m)
- Unit weight: 2141.40 (kG/m3)

- Unit weight of solid: 2702.25 (kG/m3)
- Internal friction angle: 18.0 (Deg)
- Cohesion: 0.07 (MPa)

1.2.3 Limit states

Condition not met for: Soil capacity
The reinforcing steel strength exceeds the range of values allowed by the code: - 3.2.2 (3)
Safety factor of bottom reinforcement in the direction of X axis: 0.00 < 1.0
Safety factor of bottom reinforcement in the direction of Y axis: 0.00 < 1.0

Stress calculations

Soil type under foundation: not layered
Design combination **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Calculation results: On the foundation level
Weight of foundation and soil over it: Gr = 27.60 (kN)
Design load:
Nr = 818.31 (kN) Mx = -1.37 (kN*m) My = -2.32 (kN*m)
Soil profile parameters:
C = 0.00 (MPa)
ϕ = 0.0
γ = 0.00 (kG/m3)
Stress in soil: 0.37 (MPa)
Design soil pressure 0.20 (MPa)
Safety factor: 0.5401 > 1

Uplift

Uplift in SLS
Design combination: **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight

Contact area: s = 2.47
s_{lim} = 1.00

Sliding

Design combination **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Weight of foundation and soil over it: Gr = 27.60 (kN)
Design load:
Nr = 818.31 (kN) Mx = -1.37 (kN*m) My = -2.32 (kN*m)
Equivalent foundation dimensions: A_ = 1.50 (m) B_ = 1.50 (m)
Sliding area: 2.25 (m2)
Foundation/soil friction coefficient: tg(ϕ) = 0.32
Cohesion: C = 0.07 (MPa)
Sliding force value F = 5.40 (kN)
Value of force preventing foundation sliding:
- On the foundation level: F(stab) = 416.64 (kN)
Stabilility for sliding: 77.16 > 1

Average settlement

Soil type under foundation: not layered
Design combination **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Weight of foundation and soil over it: Gr = 27.60 (kN)
Average stress caused by design load: q = 0.36 (MPa)
Thickness of the actively settling soil: z = 4.50 (m)
Stress on the level z:
- Additional: σ_{zd} = 0.02 (MPa)
- Caused by soil weight: $\sigma_{z\gamma}$ = 0.11 (MPa)
Settlement:
- Original s' = 14 (mm)
- Secondary s'' = 0 (mm)
- TOTAL S = 14 (mm) < Sadm = 50 (mm)

Safety factor: 3.554 > 1

Settlement difference

Design combination **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Settlement difference: S = 0 (mm) < Sadm = 50 (mm)
Safety factor: 151.9 > 1

Rotation

About OX axis
Design combination **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Weight of foundation and soil over it: Gr = 27.60 (kN)
Design load:
Nr = 818.31 (kN) Mx = -1.37 (kN*m) My = -2.32 (kN*m)
Stability moment: M_{stab} = 613.73 (kN*m)
Rotation moment: M_{renv} = 1.37 (kN*m)
Stability for rotation: 446.4 > 1

About OY axis
Design combination: **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Weight of foundation and soil over it: Gr = 27.60 (kN)
Design load:
Nr = 702.36 (kN) Mx = -1.00 (kN*m) My = -2.05 (kN*m)
Stability moment: M_{stab} = 526.77 (kN*m)
Rotation moment: M_{renv} = 2.05 (kN*m)
Stability for rotation: 256.5 > 1

1.3 RC design

1.3.1 Assumptions

- Exposure : XC1
- Structure class : S4

1.3.2 Analysis of punching and shear

Punching

Design combination **ULS : 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012**
Load factors: **1.35** * Foundation weight
1.35 * Soil weight
Design load:
Nr = 1122.12 (kN) Mx = -1.91 (kN*m) My = -3.18 (kN*m)
Length of critical circumference: 3.22 (m)
Punching force: 728.29 (kN)
Section effective height h_{eff} = 0.43 (m)
Reinforcement ratio: ρ = 0.20 %
Shear stress: 0.53 (MPa)
Admissible shear stress: 1.14 (MPa)
Safety factor: 2.14 > 1

1.3.3 Required reinforcement

Condition not met for: Soil capacity
The reinforcing steel strength exceeds the range of values allowed by the code: - 3.2.2 (3)
Safety factor of bottom reinforcement in the direction of X axis: 0.00 < 1.0
Safety factor of bottom reinforcement in the direction of Y axis: 0.00 < 1.0

Spread footing:

bottom:

ULS : 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012
My = 168.58 (kN*m) A_{sx} = 966 (mm2/m)

ULS : 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012
Mx = 106.03 (kN*m) A_{sy} = 769 (mm2/m)

$A_{s\ min}$ = 769 (mm2/m)

top:
A'_{sx} = 0 (mm2/m)
A'_{sy} = 0 (mm2/m)

$A_{s\ min}$ = 0 (mm2/m)

Column pier:
Longitudinal reinforcement A = 0 (mm2) $A_{min.}$ = 0 (mm2)
A = 2 * (Asx + Asy)
Asx = 0 (mm2) Asy = 0 (mm2)

1.3.4 Provided reinforcement

Spread footing:
Bottom:

Insufficient footing reinforcement

Pier
Longitudinal reinforcement

2 Material survey:

- Concrete volume = 1.13 (m3)
- Formwork = 3.00 (m2)

Foundation 351 - Calculation Report

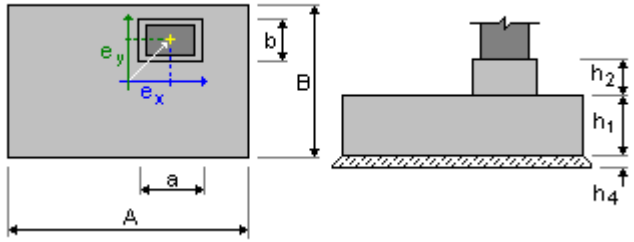
1 Spread footing: Foundation351 Number of identical elements: 1

1.1 Basic data

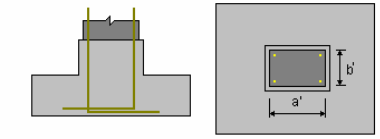
1.1.1 Assumptions

- Geotechnic calculations according to : BS 8004
- Concrete calculations according to : BS EN1992-1-1:2004 NA:2005
- Shape selection : without limits

1.1.2 Geometry:



A	= 1.90 (m)	a	= 0.60 (m)
B	= 1.50 (m)	b	= 0.20 (m)
h1	= 0.50 (m)	e_x	= 0.00 (m)
h2	= 0.00 (m)	e_y	= 0.00 (m)
h4	= 0.10 (m)		



a' = 600 (mm)

b' = 200 (mm)
$c_{nom}1$ = 60 (mm)
$c_{nom}2$ = 60 (mm)
Cover deviations: Cdev = 10(mm), Cdur = 0(mm)

1.1.3 Materials

- Concrete : C20/25 (02); Characteristic strength = 20.00 MPa
  Unit weight = 2501.36 (kG/m3)
  Rectangular stress distribution [3.1.7(3)]
- Longitudinal reinforcement : type HA 320 Characteristic strength = 320.00 MPa
  Ductility class: -
  Horizontal branch of the stress-strain diagram
- Transversal reinforcement : type HA 500 Characteristic strength = 500.00 MPa
- Additional reinforcement: : type Characteristic strength = 460.00 MPa

1.1.4 Loads:

Foundation loads:

Case	Nature	Group	N (kN)	Fx (kN)	Fy (kN)	Mx (kN*m)	My (kN*m)
1	dead load(Structural)	351	627.69	-3.91	-2.94	-0.00	0.00
2	dead load(Non-structural)	351	72.95	-0.03	0.00	-0.00	0.00
3	dead load(Non-structural)	351	169.25	-0.10	0.05	0.00	0.00
4	dead load(Non-structural)	351	26.18	-0.01	-0.01	-0.00	-0.00
5	dead load(Non-structural)	351	115.32	-0.02	-0.02	0.00	0.00
6	dead load(Non-structural)	351	20.90	-0.01	-0.00	0.00	0.00
7	dead load(Non-structural)	351	-0.01	-0.02	0.00	-0.00	-0.00
8	dead load(Non-structural)	351	338.51	-0.02	-0.07	-0.00	0.00
10	live load(Category A)	351	31.27	-0.01	0.00	0.00	0.00
11	live load(Category A)	351	-0.04	-0.20	0.15	-0.00	-0.00
12	live load(Category A)	351	211.57	-0.01	-0.02	0.00	0.00
9	dead load(Non-structural)	351	59.53	-14.01	-0.84	-0.00	0.00

Backfill loads:

Case	Nature	Q1 (kN/m2)

1.1.5 Combination list

1/	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012
2/	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009
3/	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+0.8010+0.8011+0.8012
4/*	ULS : 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012
5/*	ULS : 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359
6/*	ULS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.5010+1.5011+1.5012
7/*	ULS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009
8/*	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012
9/*	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009
10/*	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+0.5010+0.5011+0.5012
11/*	SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+0.3010+0.3011+0.3012

1.2 Geotechnical design

1.2.1 Assumptions

Foundation design for:
- Capacity
- Rotation
- Sliding
- Sliding with soil pressure considered: none
- Uplift
- Average settlement

1.2.2 Soil:

Soil level:	N_1	= 0.00 (m)
Column pier level:	N_a	= 0.00 (m)
Minimum reference level:	N_f	= -0.50 (m)

very fine sands
- Soil level: 0.00 (m)
- Unit weight: 2141.40 (kG/m3)

- Unit weight of solid: 2702.25 (kG/m3)
- Internal friction angle: 18.0 (Deg)
- Cohesion: 0.07 (MPa)

1.2.3 Limit states

Condition not met for: Soil capacity
The reinforcing steel strength exceeds the range of values allowed by the code: - 3.2.2 (3)
Safety factor of bottom reinforcement in the direction of X axis: 0.00 < 1.0
Safety factor of bottom reinforcement in the direction of Y axis: 0.00 < 1.0

Stress calculations

Soil type under foundation: not layered
Design combination **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Calculation results: On the foundation level
Weight of foundation and soil over it: Gr = 34.96 (kN)
Design load:
Nr = 1708.07 (kN) Mx = 1.85 (kN*m) My = -9.18 (kN*m)
Soil profile parameters:
C = 0.00 (MPa)
ϕ = 0.0
γ = 0.00 (kG/m3)
Stress in soil: 0.61 (MPa)
Design soil pressure 0.20 (MPa)
Safety factor: 0.3268 > 1

Uplift

Uplift in SLS
Design combination: **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight

Contact area: s = 3.04
s_{lim} = 1.00

Sliding

Design combination **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Weight of foundation and soil over it: Gr = 34.96 (kN)
Design load:
Nr = 1465.27 (kN) Mx = 1.91 (kN*m) My = -9.07 (kN*m)
Equivalent foundation dimensions: A_ = 1.90 (m) B_ = 1.50 (m)
Sliding area: 2.85 (m2)
Foundation/soil friction coefficient: tg(ϕ) = 0.32
Cohesion: C = 0.07 (MPa)
Sliding force value F = 18.53 (kN)
Value of force preventing foundation sliding:
- On the foundation level: F(stab) = 667.05 (kN)
Stabilility for sliding: 35.99 > 1

Average settlement

Soil type under foundation: not layered
Design combination **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Weight of foundation and soil over it: Gr = 34.96 (kN)
Average stress caused by design load: q = 0.60 (MPa)
Thickness of the actively settling soil: z = 5.25 (m)
Stress on the level z:
- Additional: σ_{zd} = 0.03 (MPa)
- Caused by soil weight: $\sigma_{z\gamma}$ = 0.12 (MPa)
Settlement:
- Original s' = 26 (mm)
- Secondary s'' = 0 (mm)
- TOTAL S = 26 (mm) < Sadm = 50 (mm)

Safety factor: 1.888 > 1

Settlement difference

Design combination **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009+1.0010+1.0011+1.0012**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Settlement difference: S = 1 (mm) < Sadm = 50 (mm)
Safety factor: 54.65 > 1

Rotation

About OX axis
Design combination **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Weight of foundation and soil over it: Gr = 34.96 (kN)
Design load:
Nr = 1465.27 (kN) Mx = 1.91 (kN*m) My = -9.07 (kN*m)
Stability moment: M_{stab} = 1098.95 (kN*m)
Rotation moment: M_{renv} = 1.91 (kN*m)
Stability for rotation: 574.5 > 1

About OY axis
Design combination: **SLS : 1.001+1.002+1.003+1.004+1.005+1.006+1.007+1.008+1.009**
Load factors: **1.00** * Foundation weight
1.00 * Soil weight
Weight of foundation and soil over it: Gr = 34.96 (kN)
Design load:
Nr = 1465.27 (kN) Mx = 1.91 (kN*m) My = -9.07 (kN*m)
Stability moment: M_{stab} = 1392.01 (kN*m)
Rotation moment: M_{renv} = 9.07 (kN*m)
Stability for rotation: 153.5 > 1

1.3 RC design

1.3.1 Assumptions

- Exposure : XC1
- Structure class : S4

1.3.2 Analysis of punching and shear

Punching

Design combination **ULS : 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012**
Load factors: **1.35** * Foundation weight
1.35 * Soil weight
Design load:
Nr = 2342.32 (kN) Mx = 2.48 (kN*m) My = -12.41 (kN*m)
Length of critical circumference: 3.22 (m)
Punching force: 1699.57 (kN)
Section effective height h_{eff} = 0.43 (m)
Reinforcement ratio: ρ = 0.42 %
Shear stress: 1.25 (MPa)
Admissible shear stress: 1.37 (MPa)
Safety factor: 1.094 > 1

1.3.3 Required reinforcement

Condition not met for: Soil capacity
The reinforcing steel strength exceeds the range of values allowed by the code: - 3.2.2 (3)
Safety factor of bottom reinforcement in the direction of X axis: 0.00 < 1.0
Safety factor of bottom reinforcement in the direction of Y axis: 0.00 < 1.0

Spread footing:

bottom:

ULS : 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012
My = 334.93 (kN*m) A_{sx} = 1978 (mm2/m)

ULS : 1.351+1.352+1.353+1.354+1.355+1.356+1.357+1.358+1.359+1.5010+1.5011+1.5012
Mx = 354.83 (kN*m) A_{sy} = 1637 (mm2/m)

$A_{s\ min}$ = 769 (mm2/m)

top:
A'_{sx} = 0 (mm2/m)
A'_{sy} = 0 (mm2/m)

$A_{s\ min}$ = 0 (mm2/m)

Column pier:
Longitudinal reinforcement A = 0 (mm2) $A_{min.}$ = 0 (mm2)
A = 2 * (Asx + Asy)
Asx = 0 (mm2) Asy = 0 (mm2)

1.3.4 Provided reinforcement

Spread footing:
Bottom:

Insufficient footing reinforcement

Pier
Longitudinal reinforcement

2 Material survey:

- Concrete volume = 1.43 (m3)
- Formwork = 3.40 (m2)